

## Robinson Helicopter Company Accident Report

AIRCRAFT MODEL:	<u>R44 Clipper I</u>
SERIAL NUMBER:	<u>1295</u>
REGISTRATION:	<u>N7530R</u>
ACCIDENT DATE:	<u>30 January 2018</u>
ACCIDENT LOCATION:	<u>Newport Beach, California</u>
NTSB IDENTIFICATION:	<u>WPR18FA077</u>

REPORT WRITTEN BY: Ken Martin

SIGNATURE: 

DATE: 17 June 2019

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Note: Two digital discs (DVD) containing all photos and videos taken by Robinson Helicopter Company are included at the end of this report.



## Weight & Balance, R44

### Basic Empty Weight, Center of Gravity.

Basic Empty Weight 1533.5 lb

Longitudinal CG 105.48 in

Longitudinal Moment 161744.2 in-lb

### Loading

		Location (in)	Moment (in- lb)
<u>Occupants</u>			
Right Front Seat	<u>175</u> lb	<u>49.5</u>	<u>8662.5</u>
Left Front Seat	<u>168</u> lb	<u>49.5</u>	<u>8316</u>
Right Rear Seat	<u>228</u> lb	<u>79.5</u>	<u>18126</u>
Left Rear Seat	<u>146</u> lb	<u>79.5</u>	<u>11607</u>

### Cargo

Right Front Seat	<u>5</u> lb	<u>44</u>	<u>220</u>
Left Front Seat	<u>0</u> lb	<u>44</u>	<u>0</u>
Right Rear Seat	<u>5</u> lb	<u>79.5</u>	<u>397.5</u>
Left Rear Seat	<u>12</u> lb	<u>79.5</u>	<u>954</u>

### Fuel at Takeoff

Main Fuel	<u>22</u> gallons @ 6 lb/gallon =	<u>132</u> lbs	<u>106</u>	<u>13992</u>
Auxiliary Fuel	<u>12</u> gallons @ 6 lb/gallon =	<u>72</u> lbs	<u>102</u>	<u>7344</u>

### Fuel at Time of Accident

Main Fuel	<u>21</u> gallons @ 6 lb/gallon =	<u>126</u> lbs	<u>106</u>	<u>13356</u>
Auxiliary Fuel	<u>10.5</u> gallons @ 6 lb/gallon =	<u>63</u> lbs	<u>102</u>	<u>6426</u>

### Total Weight, CG, Moment: Takeoff

Total Weight 2476.5 lb

Longitudinal CG 93.42 in

Longitudinal Moment 231363.2 in-lb

### Total Weight, CG, Moment: Time of Accident

Total Weight 2461.5 lb

Longitudinal CG 93.36 in

Longitudinal Moment 229809.2 in-lb

Note: The calculations above use the aircraft's weight and balance sheet dated 19 January 2018, fueling records, three occupant weights along with the weight of a backpack provided by coroner and one occupant weight was as reported by a family representative. The Total Weight at Time of Accident is calculated using a fuel consumption rate of 15 gallons per hour for a total running time of 10 minutes (2.5 gallons). See Appendices IV and V.

Maximum Gross Weight for this aircraft is 2400 lbs.

## Instrument and Cabin Data

<u>Instruments:</u>		<u>Switches:</u>	
Vertical Speed	400 FPM Ascent	NAV Lights	Off
Airspeed	0 Knots	Strobe	Off
Engine/Rotor Tach.	Lower Pins	Clutch	Engaged
Altimeter	8000' @ 29.98	Clutch Guard	Down
Manifold Pressure	Beyond 35 InHg	Alternator	Off
CAT	Lower Pin	Master	Off
OAT	Inoperable	Ignition	Both
Amps	0 Amps	Landing Light	On
Oil Pressure	Lower Pin	Heater Blower	N/A
Oil Temperature	Lower Pin	Map Light	Off
Cyl. Head Temp.	Lower Pin	Governor	On
Main Fuel	Empty Pin	Air Conditioner	N/A
Aux Fuel	Empty Pin	Intercom	Inoperable
Dimmer/Panel Lights	Full Bright	Hydraulics	On
Clock	Operational		
Compass	Damaged	<u>Control Knobs:</u>	
Hour Meter Collective activated	640.00 Hours	Cabin Air	Closed
Hour Meter	687.16 Hours	Mixture	Full Rich
Transponder	Inoperable	Mixture Guard	Recovered
Comm/Nav Radios	Inoperable	Carburetor Heat	Unlocked .5" up
Attitude Indicator	N/A	Cabin Heat Valve	Off
GPS	N/A	Cyclic Friction	Off
Directional Gyro	N/A	Collective Friction	Off
		Fuel Valve	Mid Position

## Survey of Temperature Stickers

Main Rotor Gear Box	All Silver	(220-270)
Tail Rotor Gear Box	140-150 Black 160-190 Silver	(140-190)
Top Belt Actuator Bearing	140-150 Black 160-190 Silver	(140-190)
Bottom Belt Actuator Bearing	N/A	(140-190)
Hydraulic Pump	All Silver	(220-270)

### **Circuit Breaker Information**

Circuit breakers for AUX PWR, GOV, HORN/START, ALT and LTS were “up” or “out”.  
All other circuit breakers were “down” or “in”.

### **Warning Light Information**

<u>Description</u>	<u>Tight Coil</u>		<u>Stretched Coil</u>
Low Rotor RPM	X		
Low Fuel	X		
TR Chip	X		
Starter On		Damaged	
MR Chip	X		
MR Temp	X		
Clutch	X		
Alternator	X		
Oil Pressure - Engine	Slightly Deformed		
Governor OFF	X		
Rotor Brake		Damaged	
Carbon Monoxide	X		
Engine Fire	X		
Fuel Filter		N/A	
Aux Fuel Pump		N/A	

### Weather at Time of Accident

Reporting Point Location	John Wayne Airport (SNA)		
Distance from Accident Site	2 miles		
Direction From Accident Site	North		
Sky Cover	Few Clouds @ 13,000' Broken Clouds @ 18,000' & @ 23,000'		
Wind	5 Knots from 210°	Temperature	26°C
Visibility	10 Statute Miles	Dew Point	-02°C
Turbulence	None Reported	Altimeter Setting	29.98 inhg
Source of Weather	METAR Report		

Reporting Point Location			
Distance from Accident Site			
Direction From Accident Site			
Sky Cover			
Wind		Temperature	
Visibility		Dew Point	
Turbulence		Altimeter Setting	
Source of Weather			

Flight Plan: Company Flight Plan

Weather Brief: None Reported

### Ground Conditions at Accident Site

Residential neighborhood

### Ground Damage

Several clay roof tiles with light structural damage on two houses and severe structural damage to one wall and associated roof area of a third house.

## WITNESS INFORMATION AND STATEMENTS

Name: Scott Blakesee (passenger)

Address:

## Huntington Beach, California

Phone No. \_\_\_\_\_ Age: 48

Email: \_\_\_\_\_

Signed Statement Taken:            Yes            x            No

Name: \_\_\_\_\_

Address:

Phone No. \_\_\_\_\_ Age: \_\_\_\_\_

Email:

Signed Statement Taken:                      Yes                      No

Name: \_\_\_\_\_

Address:

Phone No. \_\_\_\_\_ Age: \_\_\_\_\_

Email: \_\_\_\_\_

Signed Statement Taken:                      Yes                      No

Name: \_\_\_\_\_

Address:

Phone No. \_\_\_\_\_ Age: \_\_\_\_\_

Email: \_\_\_\_\_

Signed Statement Taken:                      Yes                      No

## **Witness Statement**

To: Joshua Cawthra, NTSB

From: Scott Blakeslee

Re: 1/30/18 - Crash Newport Beach - R44 N7530R

Dear Mr. Cawthra,

Per your request, I am submitting the following statement relating to my memory of the events prior to and on January 20, 2018.

Several times over the prior months leading up to the crash on January 30th, Pepe Tena had talked to me in person about how much he enjoyed, and how often he would fly/pilot a helicopter and that we should fly to Catalina one day for lunch.

About one week prior to the incident, Pepe had sent out an email to Kim (Watzman) and I suggesting a date to fly to Catalina for lunch and to see if that would work. We settled on that day via correspondence between the three of us and planned to meet at Pepe's office in Newport just before lunchtime, around 11:30 am.

The morning of the incident I got ready with my family, considering I could stay local and not have to commute up to Downtown Los Angeles that day. At approximately 10:45 am I left our house in Orange County and arrived around 11:15 am to Pepe's Newport Beach office. When I arrived, Kim and Brian (Reichelt) were already there, although I did not know until then that Brian would be joining us on the trip. We all ended up talking with each other and with some of Pepe's employees there while we waited for Pepe, who eventually arrived closer to 12 noon.

Upon Pepe's arrival, he said hello and asked if we were ready. We wrapped up our conversations there and all walked out together to Pepe's car as he said he would drive us all there together.

On the drive over, we all exchanged light conversation about work and generalities.

At one point during the brief ride, Pepe was on the phone with what I assumed was a contact at the helicopter company. As he hung up with frown, I asked if all was OK. He said everything was fine, he just wanted a different helicopter, but not a big deal.

We arrived at the airport and parked near the area where the helicopter was waiting. At that time, we all got out of the car and I, like the others, walked around a bit taking in the immediate area and the actual helicopter.

Pepe met with a gentleman in a flight suit for a couple of minutes during this time, opened the helicopter doors, walked around it, etc. He was going through what seemed to be pre-flight information/checklist items and then continued by getting in and making more comments and notes around what I could only gather as pertaining to flight and helicopter as part of pre-flight preparations. He also at this time removed what looked like a steering extension from the left side of the front passenger seat and said something about this being a pilot training tool for the helicopter.

As Kim, Brian and I were now discussing seating, Brian wanted the back, while Kim and I decided I would sit up front on the way over and that she would probably sit up front on the return flight. Kim and Brian got into the helicopter and I remained outside for a short time as Pepe was still performing what seemed like pre-flight tasks and I wasn't sure how long it might be before actually taking off.

Several minutes later I climbed in and Pepe issued out headsets and went through a few items and spoke to someone from the airport about takeoff, still seeming to be executing part of a detailed flight checklist. Kim, Brian and I were smiling and taking photos on our cell phones.

Not specifically seeing how he did it, Pepe turned on the engine and was now looking to operate the helicopter into flight.

Items I do specifically remember is the concentration on his face and his left hand on a lever between our seats that he was diligently working in concert with another handle in his right.

We began to lift off the ground, seeming to hover momentarily, then gradually continued to climb upward.

During this first minute or so of climbing I was nervously taking it all in while operating my cell phone to try and take footage to show my family. Except for being nervous and somewhat scared as this was my first time in a helicopter and the movements are far different than a plane, all appeared apparently normal as Pepe seemed in control and focused.

After another 30 seconds or so we seemed to be reaching what I thought was a pretty high altitude and slowly started turning left, continuing away from the airfield. I do remember seeing what looked like a park with small lake straight ahead of us and was thinking of our location and how it sets to Catalina, etc.

We continued on this flight path for another 30 seconds to minute, still slowly and steadily climbing in the process, but certainly more level than before.

Right at this point, we suddenly dropped, nose first, straight down.

I remember looking straight down between my legs through the glass at the ground rushing toward us and saying "God no! God no! No God! No God!" and instinctively preparing for impact.

It is so complicated to explain the feeling at impact because it was so hard, loud and really indescribable if you haven't been through this.

Everything was white for a split second as my mind and body tried to comprehend what happened and that I was still alive. Then I remember the intense pain, the taste of blood, the broken glass and crumpled metal around me as I was basically halfway in and out of the helicopter, almost on the ground.

I immediately started to yell for anyone to call 911 and for help, over and over again, while also trying to see or hear any of the others, only managing to feel and see some of Pepe who was basically laying on me.

Pepe was not responding to any of my attempts to talk or move him and my angle was exceptionally strained to move. This is when I felt I was all alone now.



Still yelling for help and finally getting some people to yell back, I managed to get to my seat belt control and unlatch, which basically let me fall/roll/fight my way out, crawling and then walking to the first open space I could find and collapsing on my back.

Some people were now starting to surround me while I laid on the ground telling them about the others in the helicopter, my name, to call my wife. They tried to comfort me while I continued to repeat myself for what seemed like several minutes or more.

During this time, I recall hearing different voices a short distance away and was really trying to listen to the words, plus I heard the sound of running liquid. Unfortunately, I could not make out the specifics of what they were saying.

A policeman arrived and started to ask me questions, which I answered as best as I could, still telling people to help the others, call my wife, find my phone, call my wife, etc.

The paramedics arrived, and I remember talking about how the pain was inside, not the cuts they can see, because I truly felt I was bleeding to death internally – not sure how I knew.

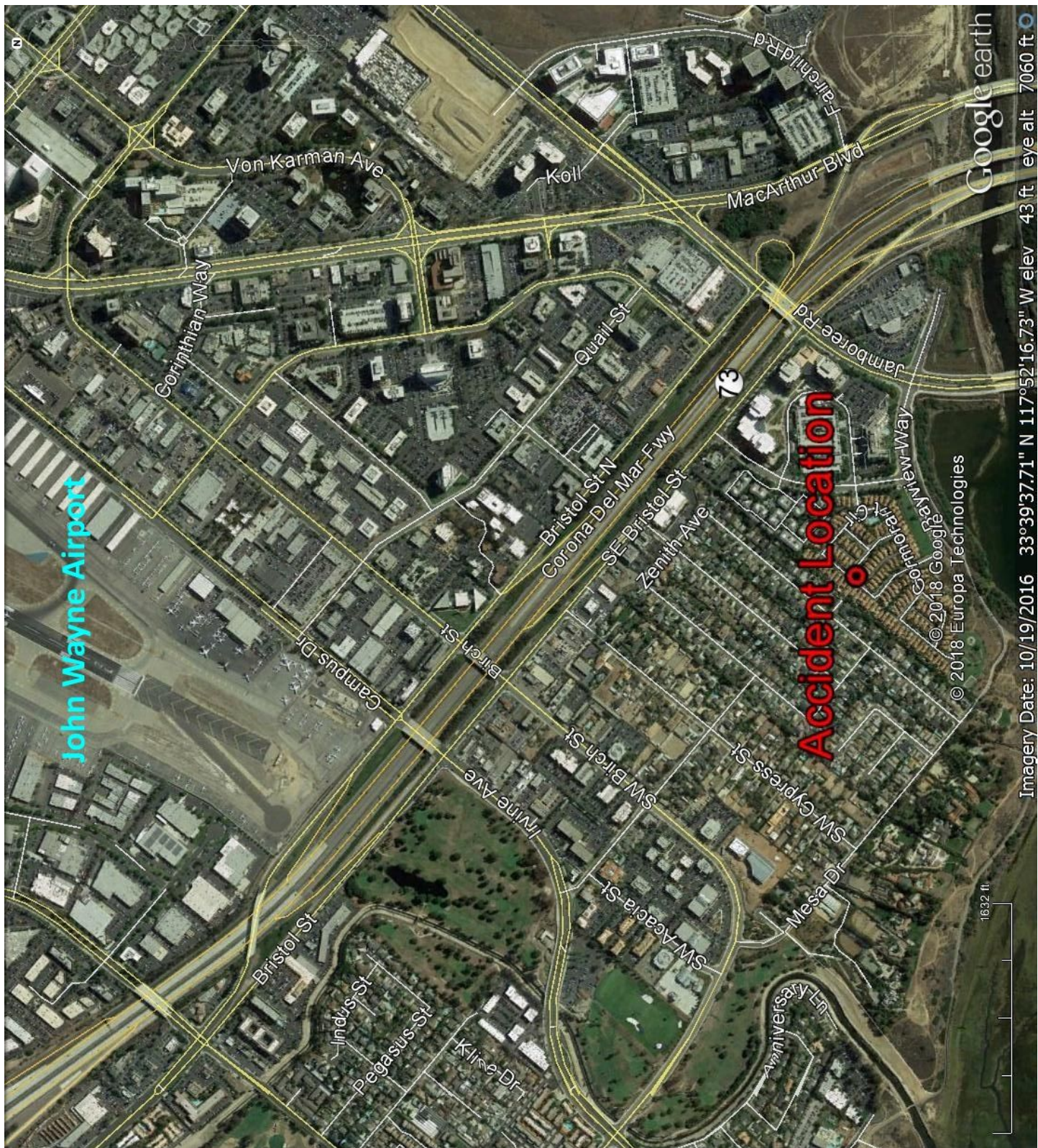
They started to cut my clothing off as I continued to answer questions and repeat myself in between with the requests to call my wife, find my phone, tell me about the others.

They loaded me into the ambulance and the same routine of conversations continued until I finally went dark, waking up in the ICU at Global Trauma Center. If you have any more questions, please feel free to contact me.

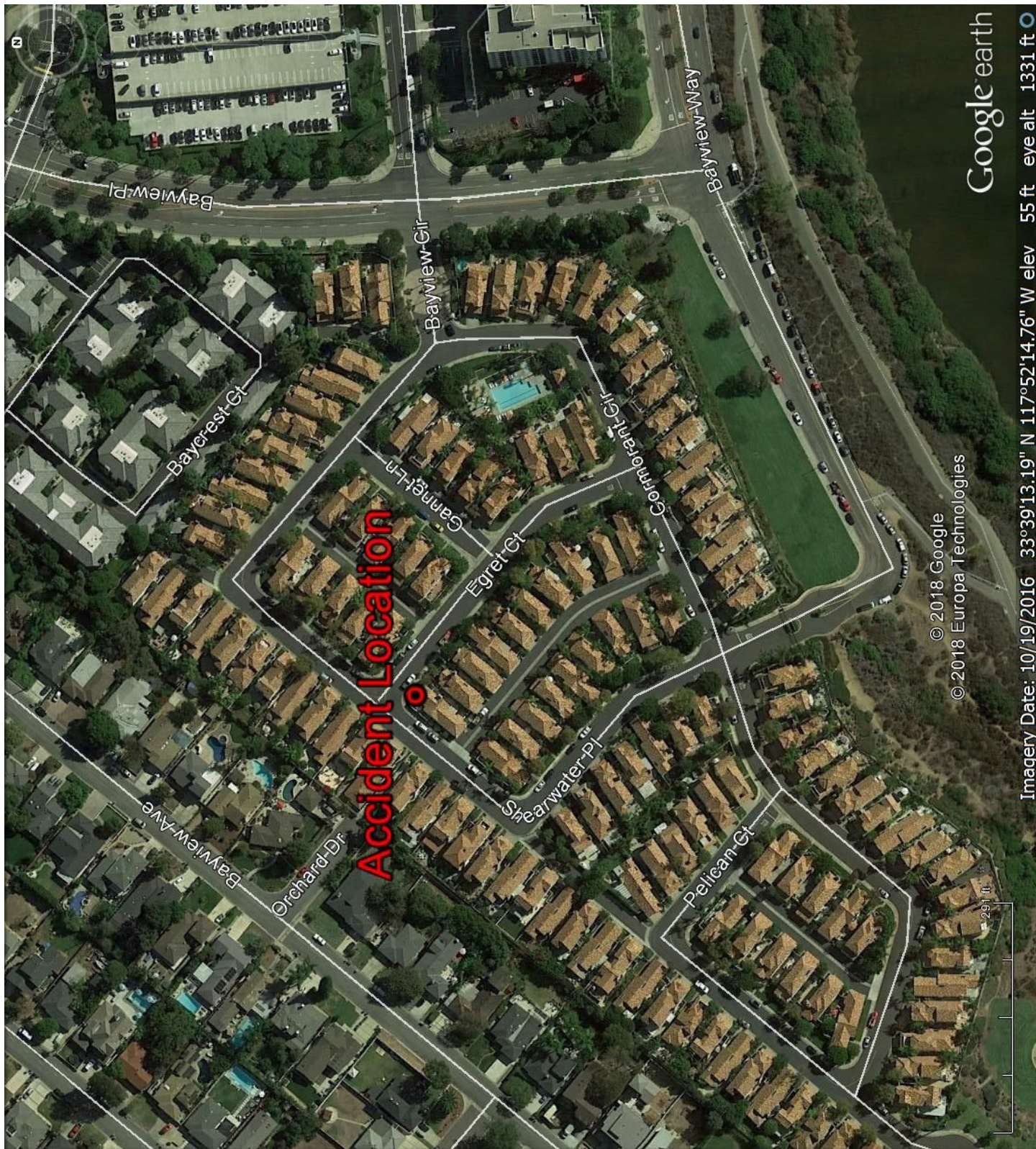
Scott Blakeslee



## ACCIDENT LOCATION











View looking approximately west at accident site



View looking east at accident site





View looking approximately northwest at accident site



View looking north from the fire engine ladder outside the garage at 45 Shearwater Place





View of the houses at, and around, 41 Egret Court looking south from fire engine ladder



The aircraft at the accident site





The aircraft at the accident site



Damage to the house at 41 Egret Court





Damage to the house at 41 Egret Court



Damage to the house at 41 Egret Court





Ground scars and paint transfer in the street near 41 Egret Court



Ground scars and paint transfer in the street near 41 Egret Court





Ground scars and paint transfer in the street near 41 Egret Court





Ground scars and paint transfer in the street near 41 Egret Court



The garage of the house at 45 Shearwater Place





Damage to the house at 45 Shearwater Place



Damage to the tree at 45 Shearwater Place





Damage to the house at 45 Shearwater Place



Debris from damage to the house at 45 Shearwater Place





Above and below: Damage to tree outside 45 Shearwater Place







Above and below: The empennage as it was found per the wreckage distribution diagram







The aft end of the tailcone as it was found per the wreckage distribution diagram



The aircraft during recovery





The aircraft during recovery



The aircraft during recovery

## WRECKAGE DISTRIBUTION LEGEND

<u>Item</u>	<u>Description</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Elevation (feet)</u>
1	Main Wreckage	33°39'14.54"N	33°39'14.54"N	56
2	Tailcone Section	33°39'13.11"N	117°52'16.47"W	57
3	Empennage	33°39'15.51"N	117°52'16.82"W	58
4	Tail Rotor Blade	33°39'15.54"N	117°52'16.86"W	58
5	Tail Rotor Gearbox	33°39'15.44"N	117°52'16.86"W	69*
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

\*Elevation on top of roof





## **WRECKAGE EXAMINATION - GENERAL**

On the evening of 30 January, 2018, a short examination of the aircraft and the accident location was performed. Present for the examination were Tealeye Cornejo and Michael Hicks (NTSB), Dan Corallo and Richard Sanchez (FAA), Hannah Warren and Thom Webster (RHC).

On 31 January, 2018, a detailed examination of the accident location and the aircraft was performed. Present for the examination were Joshua Cawthra (IIC) and Michael Hicks (NTSB), Hannah Warren, Ken Martin, and Thom Webster (RHC). The aircraft was recovered by Southwest Aircraft Recovery and transported to their facility in Chino, California. The detailed examination continued in Chino where the engine was removed. Joining the examination were David Keenan and Scott Tyrrell (FAA).

On 01 February, 2018, the engine was transported to Corona Aircraft Engines in Corona, California. The engine was examined and placed on a test stand. The engine was started and ran for several minutes. Present for the engine examination was Joshua Cawthra (IIC) and Michael Hicks (NTSB), Dan Corallo, Richard Sanchez, David Keenan and Scott Tyrrell (FAA), Hannah Warren, Ken Martin, and Thom Webster (RHC). The detailed examination of the aircraft continued in Chino with all of the persons listed above with the exception of Dan Corallo and Richard Sanchez.

Details and photographs of all of the examinations are included in the following pages.





The wreckage as examined at the facility of Southwest Aircraft Recovery in Norco, CA



## **COCKPIT AND CABIN**

The cabin came to rest with the nose against a house and lying on its left side. First responders cut away the door frames and ceiling.

The upper instrument console was separated from the lower keel panels, tethered by wires and tubing. The lower keel panels were distorted and pushed to the left side. The cyclic and center panels were also distorted and torn.

The pedals were positioned with the left pedal against the forward stop. The cyclic stick was cut by first responders. The collective was positioned at approximately 75% of upward travel. The removable controls were recovered from under the front left seat. The float activation lever was in the ready position and the switch was disarmed (locked off).

A removable mount for an electronic device was recovered from the cabin area.

All four seat structures were crushed downward. The front right seat structure was crushed inward along with the door frame and belly structure. The outboard section of the aft left seat structure was torn away along with the door frame, belly and floor structure.

All four seat belts were cut by first responders. The inertial reels for the forward two and aft left seat belts locked and free-wheeled normally, the aft right belt was retracted into the reel and not accessible

Fragments from all four doors and both windshields were recovered at the accident location.





Cabin area





The upper instrument console



The lower instrument console





The radio rack

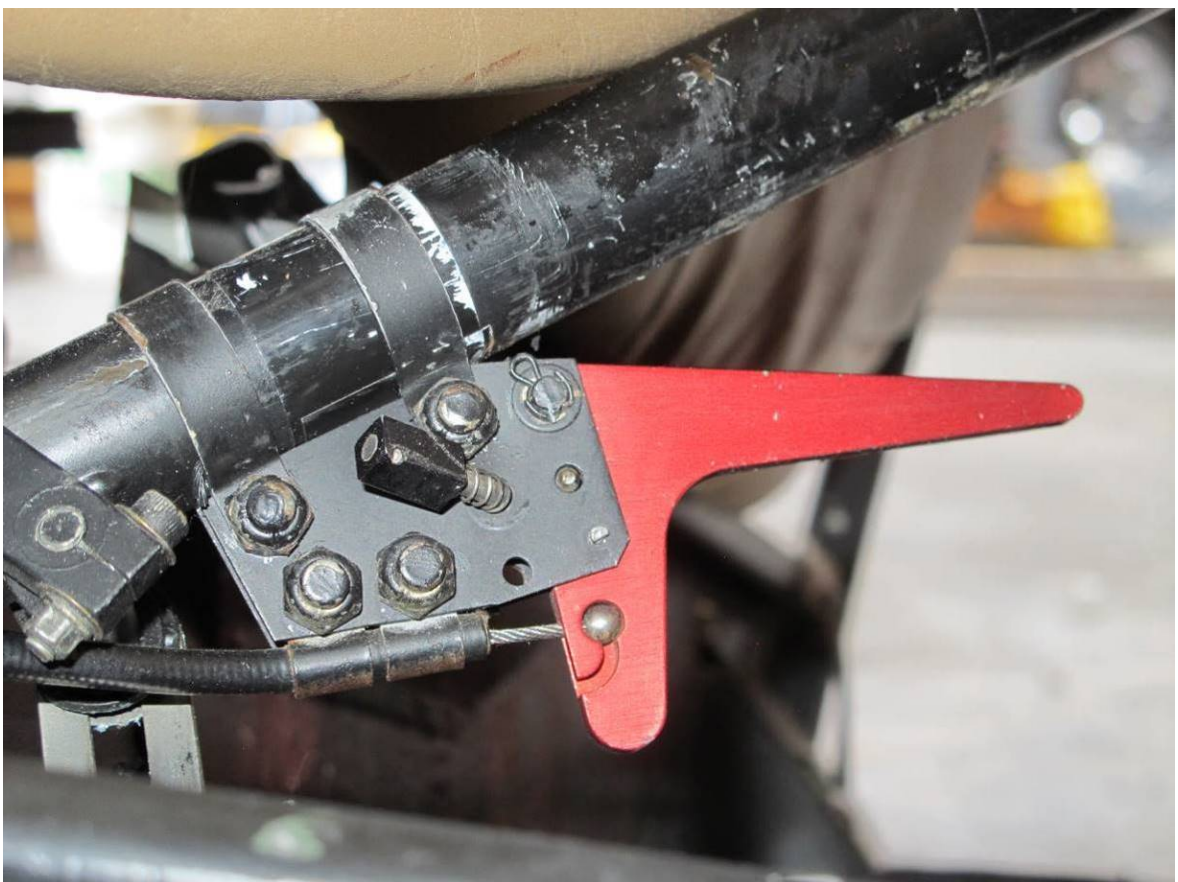


The position of the collective control





The collective friction slider



The pop-out floats arm/disarm switch, in the disarm position





The tail rotor pedals, right seat

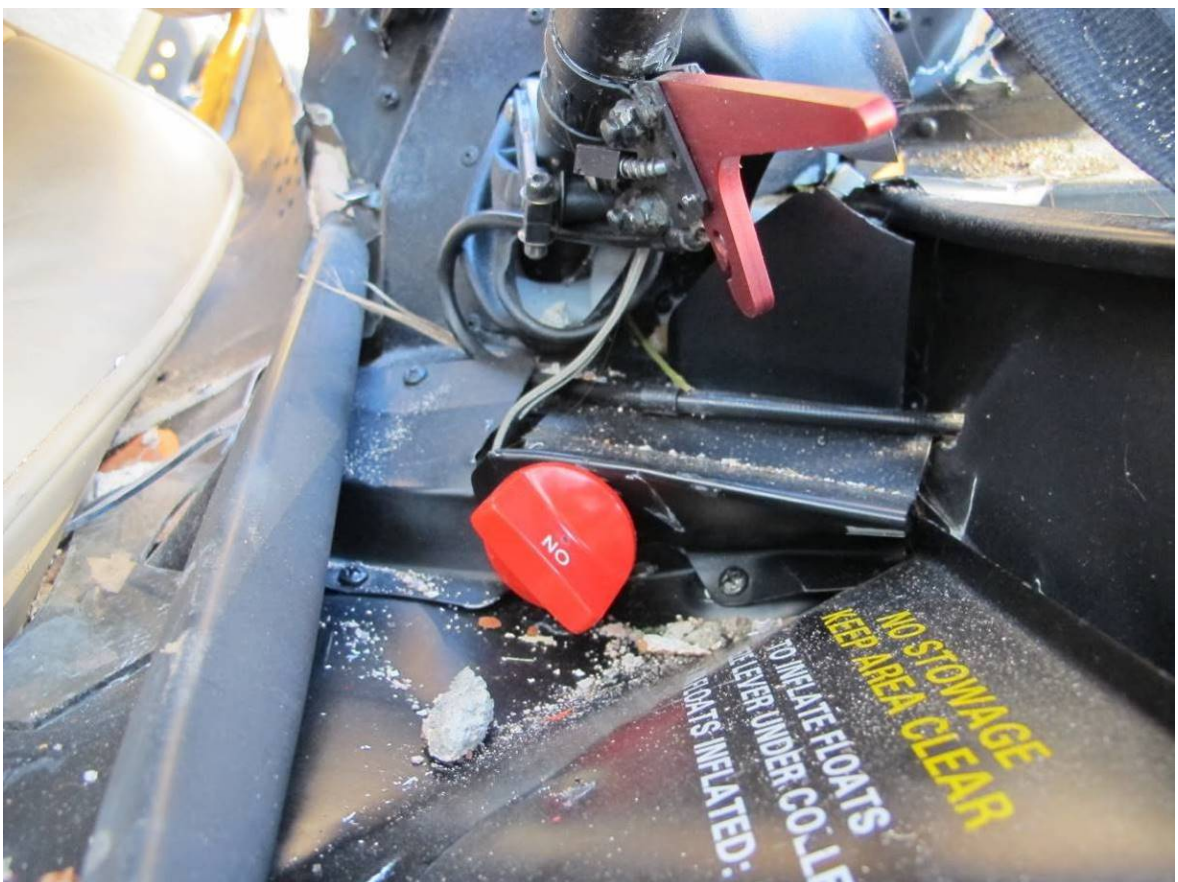


The cyclic panel and lower portion of the cyclic stick (cut by first responders)





The upper portion of the cyclic stick



The fuel valve





The removable controls



The circuit breaker panel





Engine hour meter



Aircraft hour meter, labeled "collective activated"



GPS or electronic device mount





Above and below: Front right seat structure.







Front left seat structure.



Right rear seat.





Right rear seat structure.



Left rear seat.



Left rear seat structure.



## **FUEL SYSTEM**

The main fuel tank remained secured to the airframe and sustained minor impact damage. The fuel cap remained secure on the filler neck.

The auxiliary fuel tank remained secured to the airframe and sustained substantial impact damage to the upper and forward surfaces along with the inner surface. The fuel cap remained secure on the filler neck.

Both fuel tank bladders appeared to be undamaged.

The cross feed hose was damaged near the auxiliary fuel tank outlet fitting. All other fuel lines and fittings remained secure and clear of obstructions.

The gascolator bowl and screen were removed and photographed. The bowl was full of a liquid which had the color and odor of aviation gasoline. No water was present when checked with water indicating paste. The screen had a very small amount of debris.

The vent line for the auxiliary fuel tank was disconnected in two places, and the tank interconnect hose was disconnected at the auxiliary tank fitting. The remaining fuel system vent hoses were intact and connected. Both check valves operated properly. All hoses, lines and tubes were determined to be clear of obstructions by blowing through the tubes.

Sixteen gallons of fuel was drained from the main tank and six gallons from the auxiliary tank. First responders reported that fuel was leaking onto the street for a short time.



The main fuel tank and filler cap



The auxiliary fuel tank and filler cap



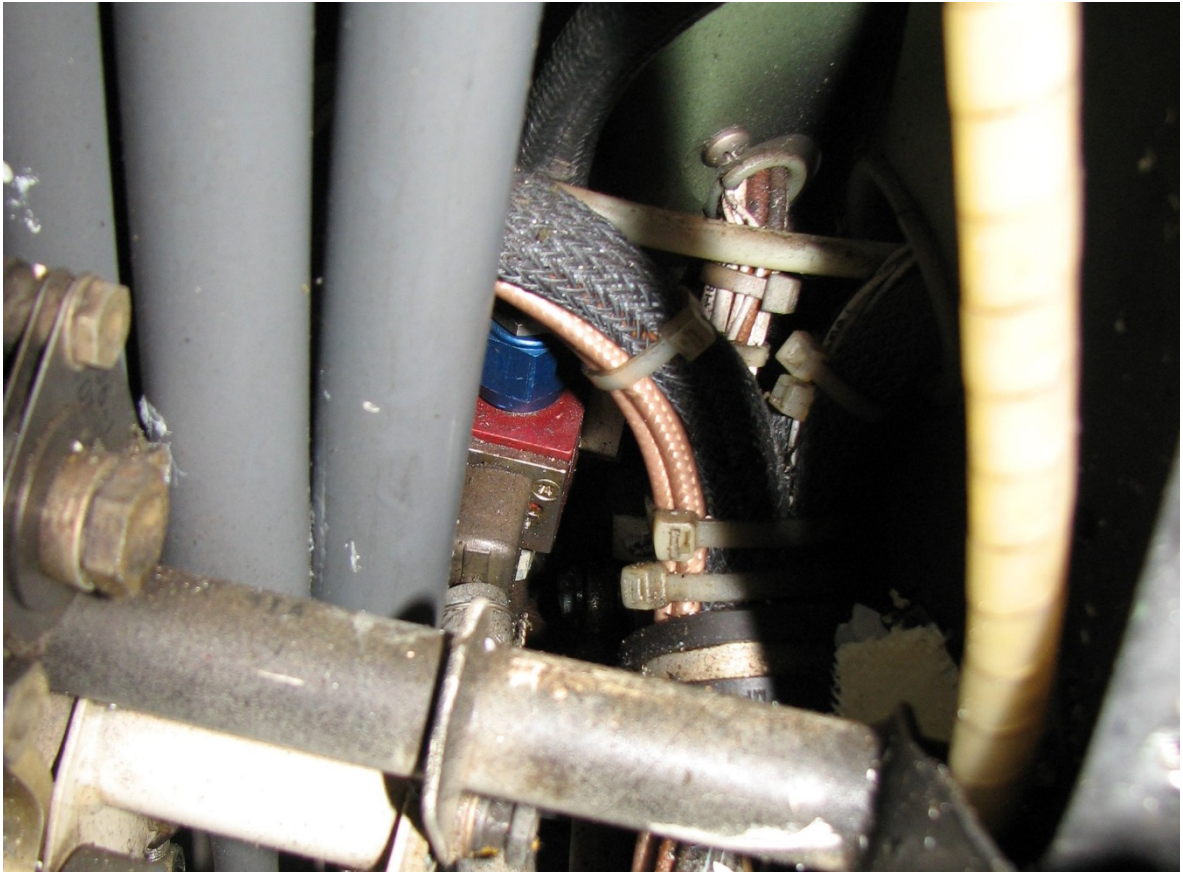


The auxiliary fuel tank, after removal from the airframe

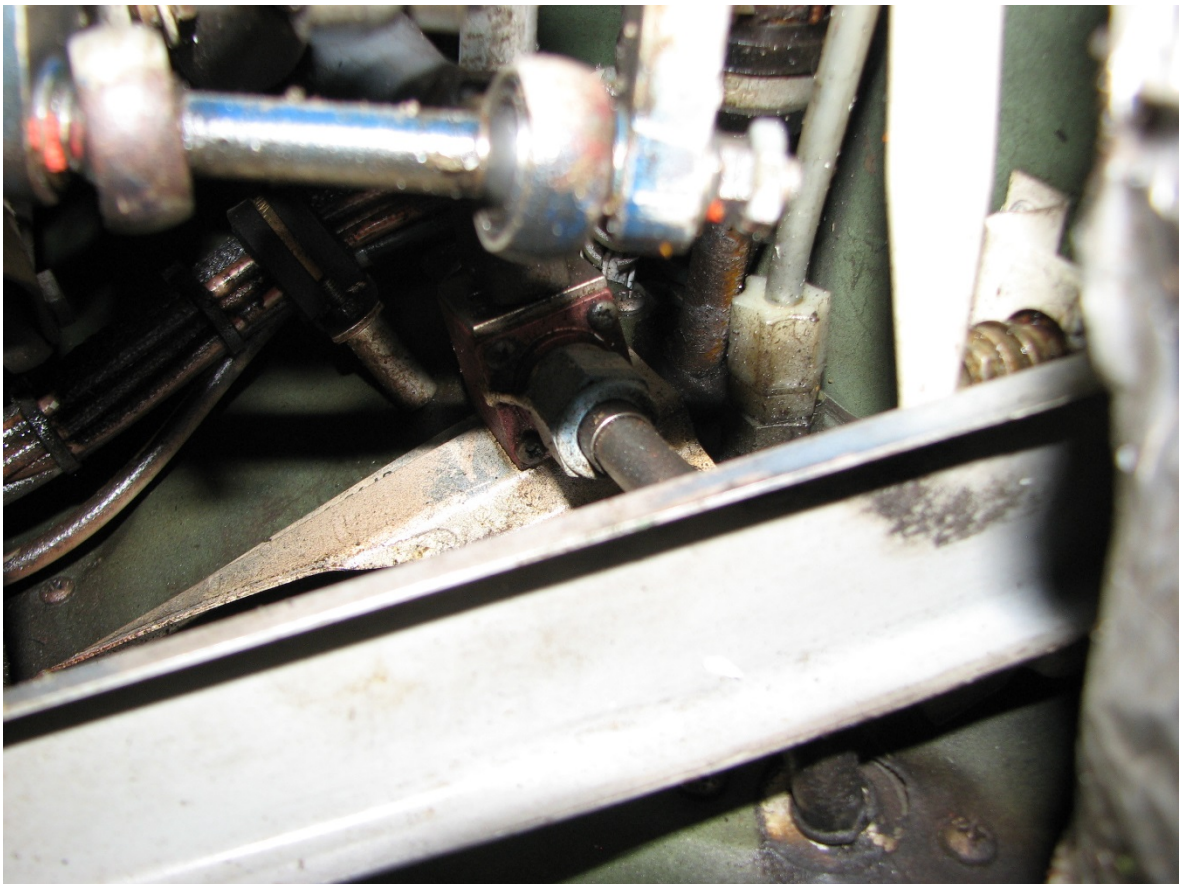


Damage to crossover hose



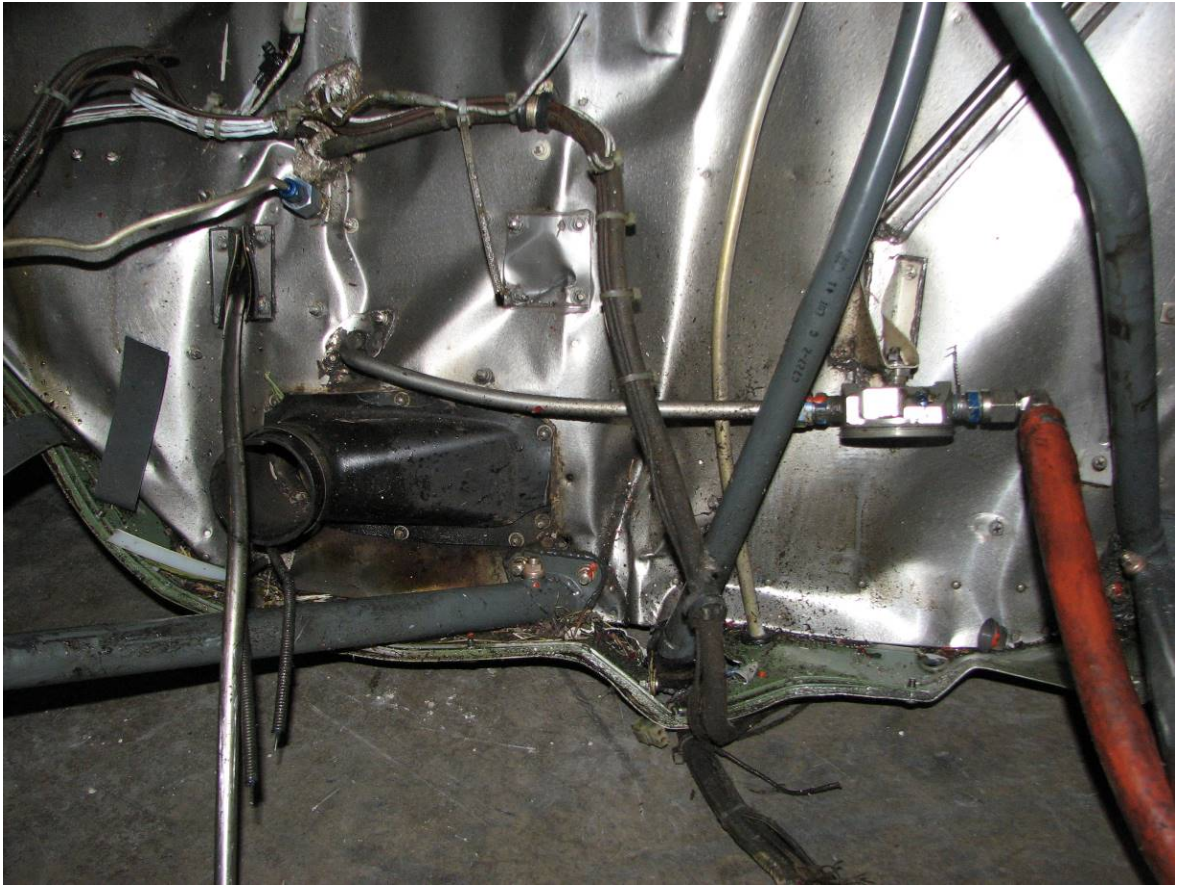


The fuel valve



The C741-1 fuel line to the gascolator – portion forward of firewall





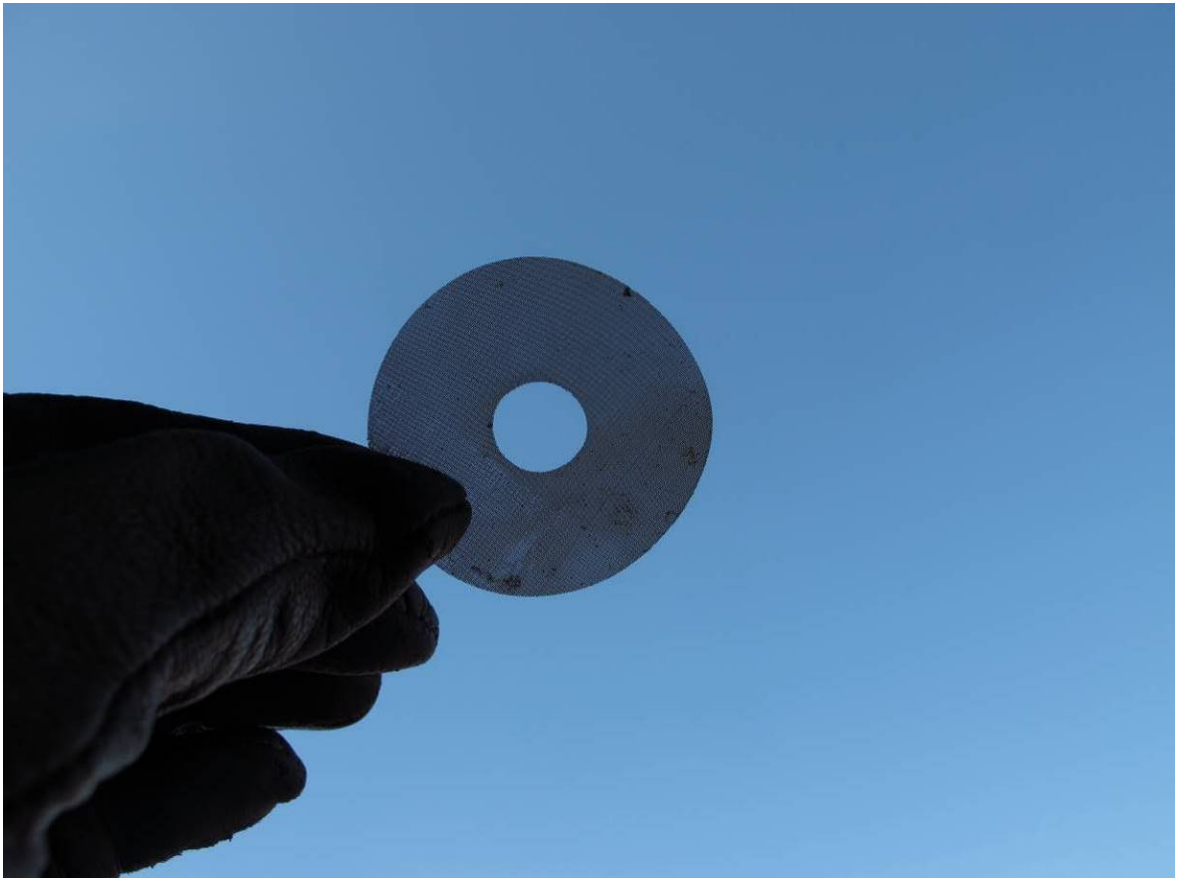
The C741-1 fuel line to the gascolator



The gascolator



The gascolator bowl, after removal from gascolator



The gascolator screen





The gascolator screen

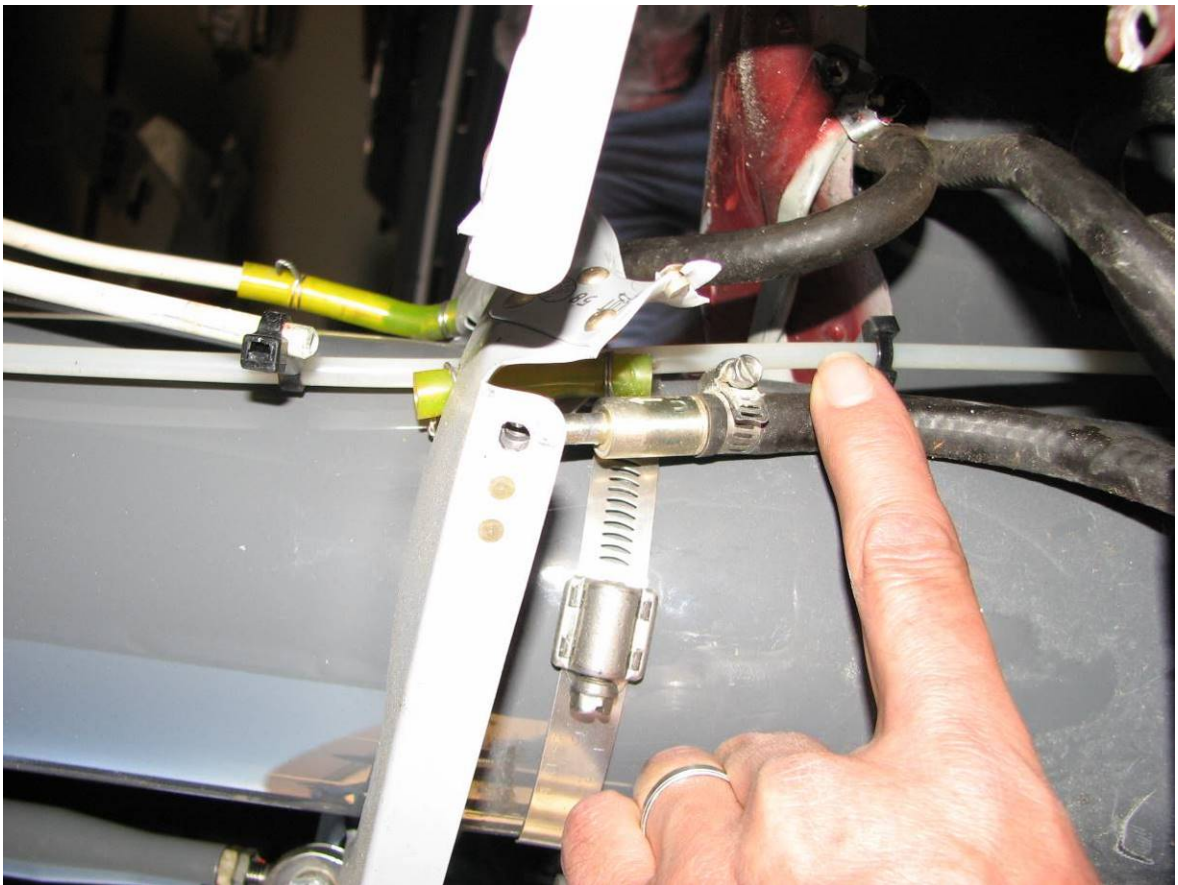


The B283-3 fuel line to the carburetor, disconnected during recovery

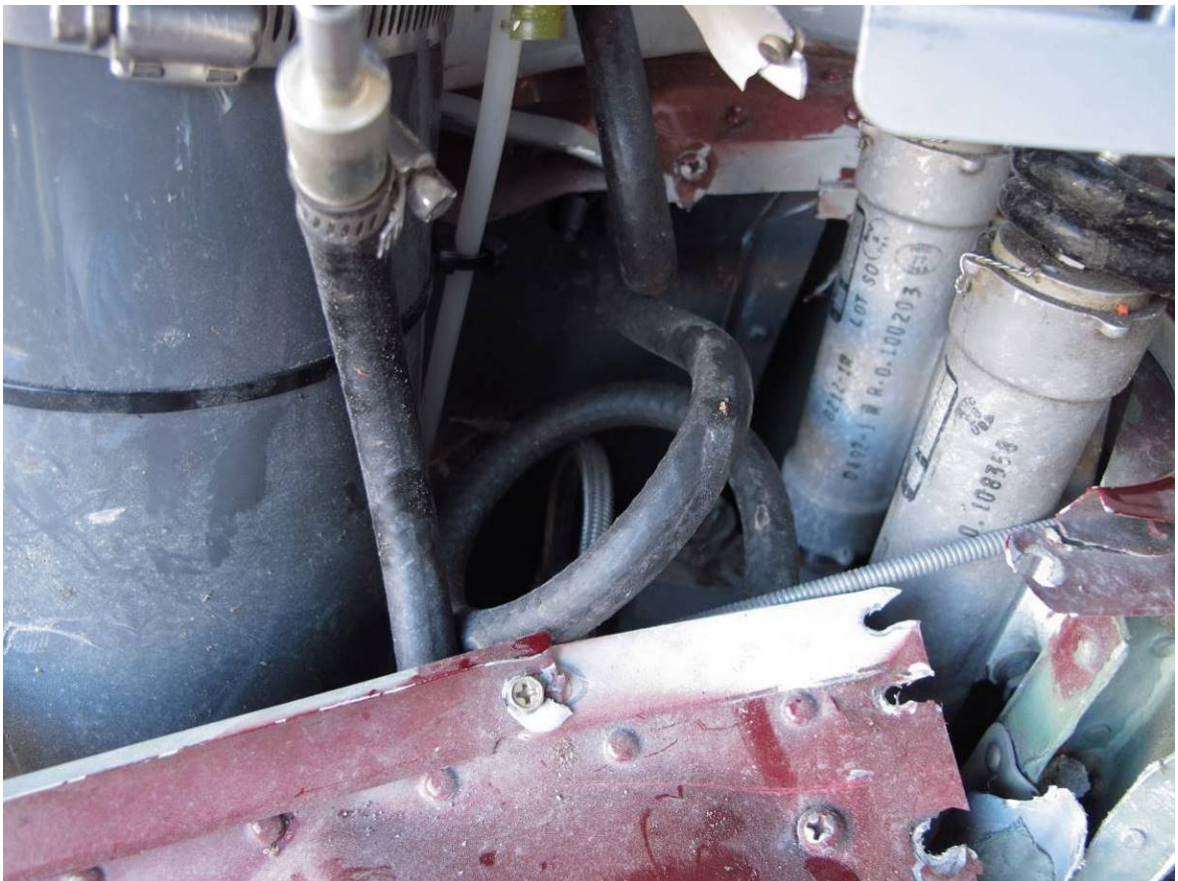


The C731-1 vent lines in the mast fairing





Above and below: The fuel vent lines at the base of the mast fairing





Above and below: The vent tube fittings at the auxiliary tank





## POWERPLANT CONTROLS

The fuel mixture control knob was in the full rich position. The fuel mixture control knob guard was recovered near the cabin. The fuel mixture control arm on the carburetor was in a full rich position and moved freely yet the control wire was detached from the fitting. The hardware on the fitting was secure. The return spring was in place. The fuel mixture control wire sheath was secure in the mounting clamps on the mount. The mount was separated from the airbox.

The carburetor heat control knob was unlocked and raised 0.5" (partially on). The locking collar on the knob was improperly installed which prevented the knob from being locked off. The friction at the carburetor heat assist friction clutch felt normal. The carburetor heat slider valve was in the full on, or hot, position. The carburetor heat control wire was secure on the slider valve. The carburetor heat control wire sheath was secure in the mounting clamps on the mount.

The throttle connecting rod on the collective was in an approximately  $\frac{1}{4}$  open position. The throttle arm on the carburetor was in a fully open position yet the control push pull tube was bent upward. There were several disconnects in the throttle linkage. The surfaces of all of the disconnects were angular and jagged.

The governor control motor was disconnected from the housing. The surfaces of all of the fractured screws were angular and jagged.

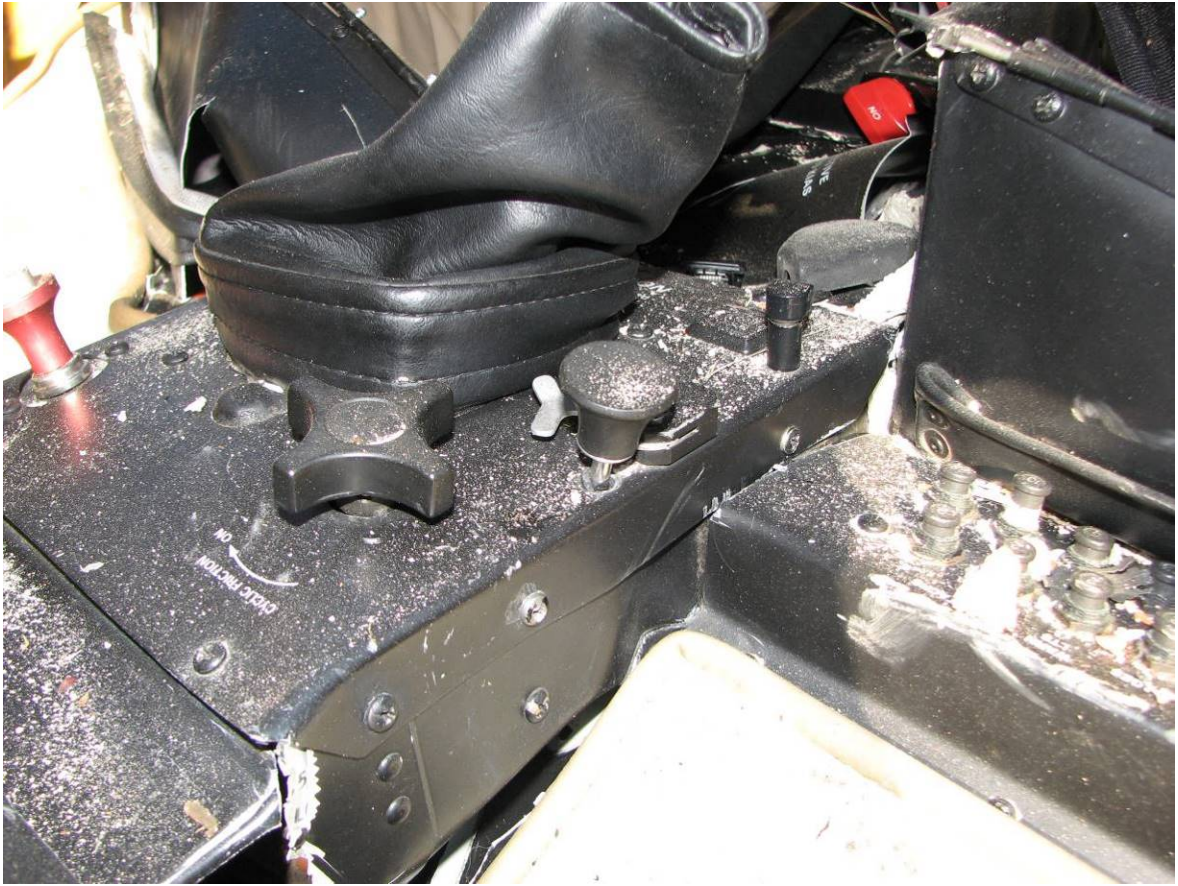


The fuel mixture control knob

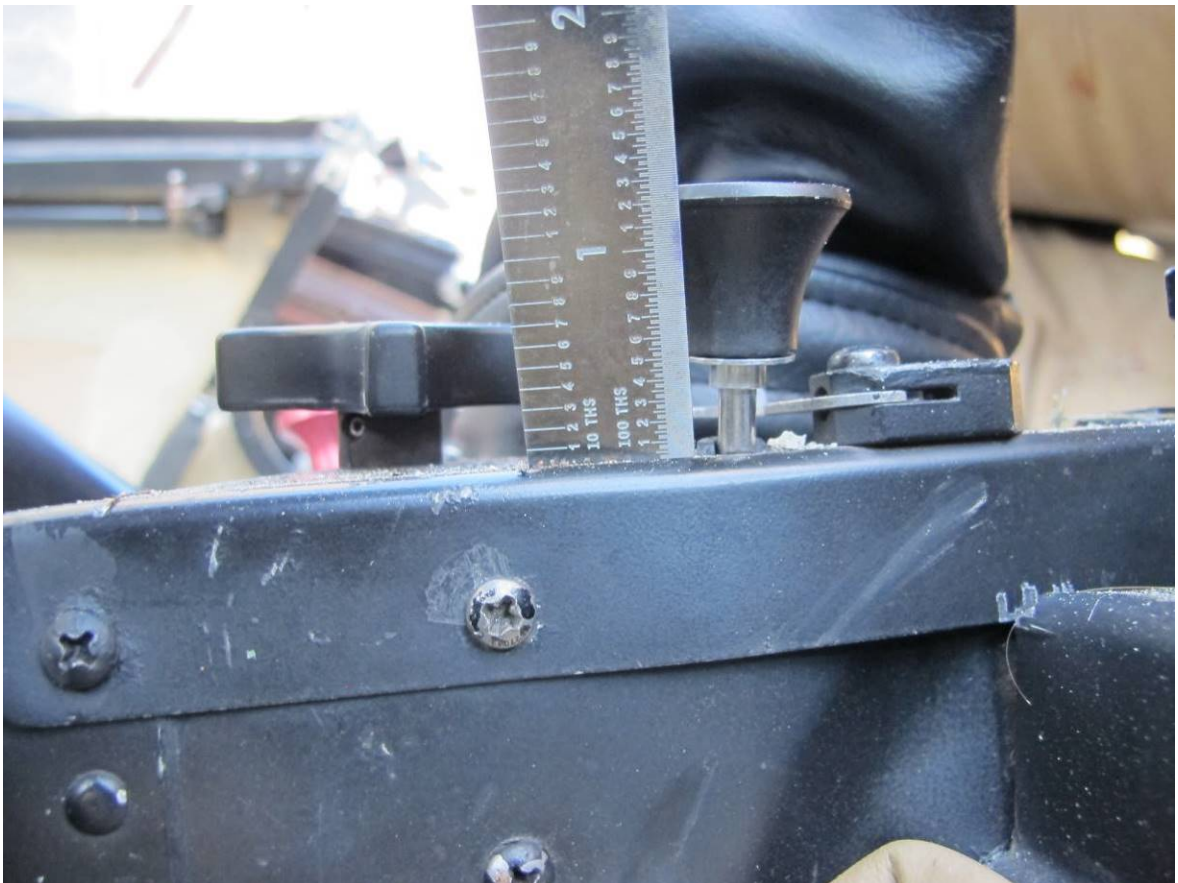


The fuel mixture control arm at the carburetor, showing detached cable





The carburetor heat control knob and latch



The carburetor heat control knob position



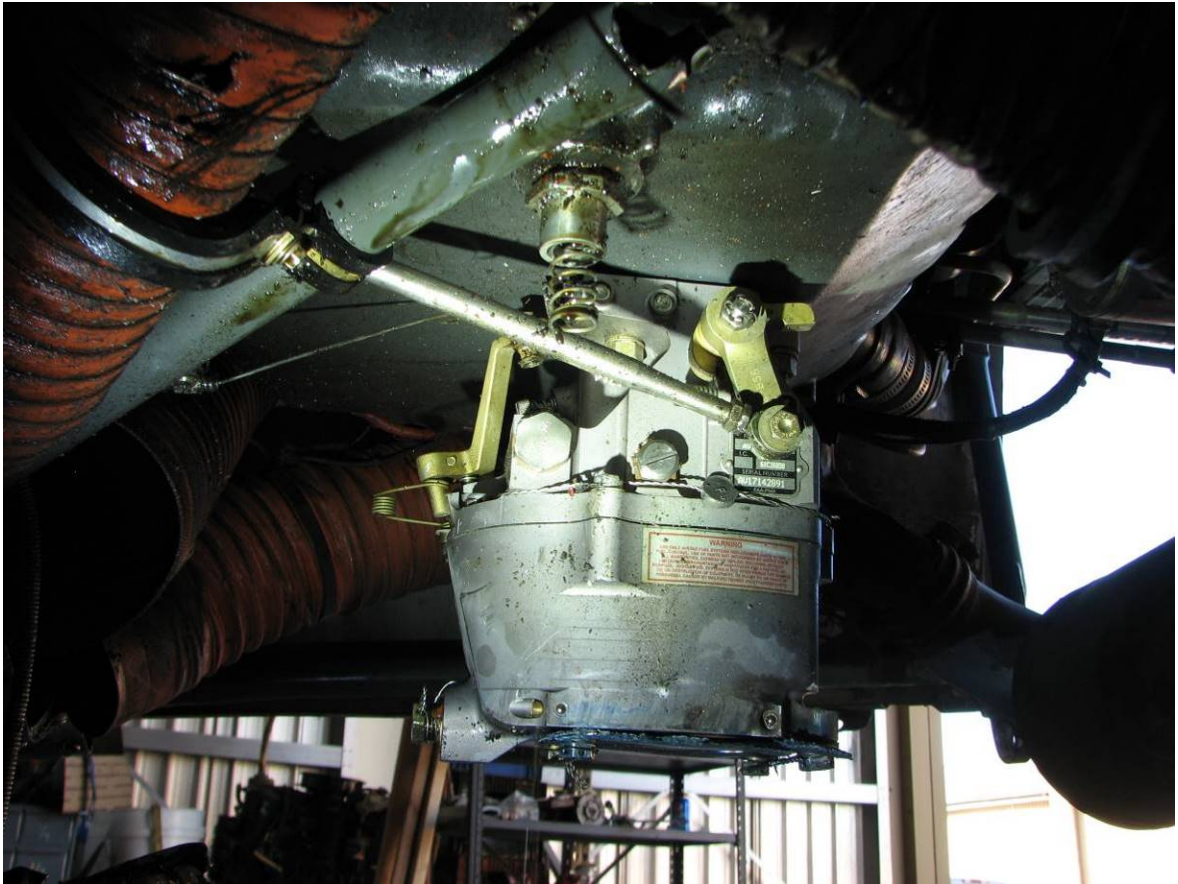


The carburetor heat slider valve



The throttle connecting rod at the back of the collective





The throttle arm at the carburetor



Fracture at the base of the overtravel spring





The forward end of the C336-1 throttle push pull tube



The aft end of the C336-1 throttle push pull tube





The fractured governor motor assembly

## POWERPLANT

The powerplant sustained very minor impact damage. The exhaust system was crushed and deformed. A valve cover and surrounding cooling panels were dented. The cooling fan was crushed on the lower section, between the four and eight o'clock positions. The cooling scroll was crushed in the same area. The airbox was crushed and separated from the carburetor. The air filter appeared to be clean. The ignition wires were crushed and some were cut/separated.

The fanshaft nut roll pin remained aligned with the alignment mark. The fanshaft and fan hub had areas of material transfer on their mating surfaces.

The aft face of the upper sheave had score marks around most of the circumference. The forward surface of the clutch centering strut and the actuator had score marks adjacent to the aft face of the upper sheave parallel to the direction of rotation of the sheave.

The oil cooler and cooling panel was dented and had contact marks adjacent to the starter ring gear, appearing to match the size and spacing of the ring gear teeth.

The upper spark plugs were removed and appeared to be serviceable.

The crankshaft was rotated by hand more than 360° with no anomalies. Suction and compression were present in all cylinders. The oil sump screen was removed and photographed. Small pieces of magneto drive cushion were found in the screen.

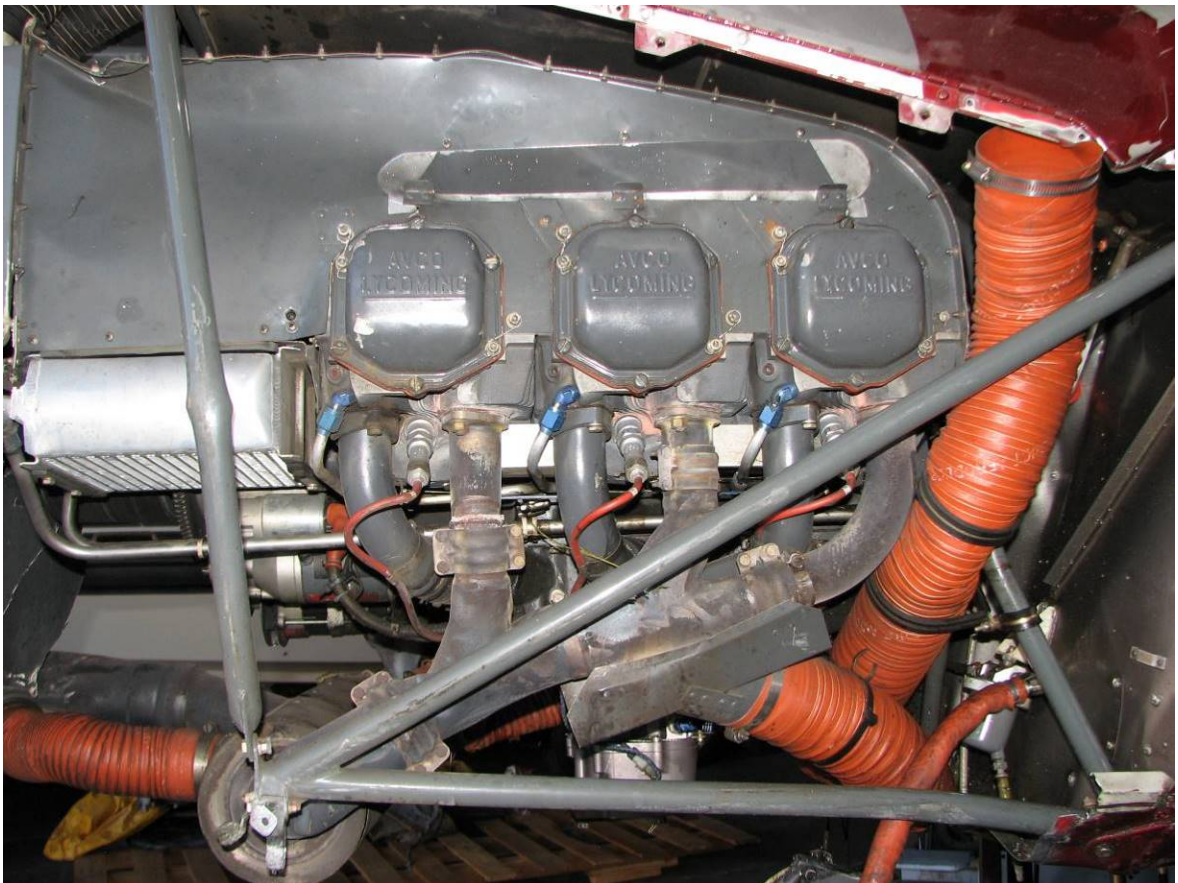
The magnetos were removed, revealing a magneto drive cushion missing two small pieces. The magnetos were reinstalled and set to proper timing.

The engine was placed on a test stand and functionally tested. After replacing the damaged ignition wires, the engine was run at full power with no anomalies. See Lycoming's accident report for details on performance.





The engine from the left side of the aircraft

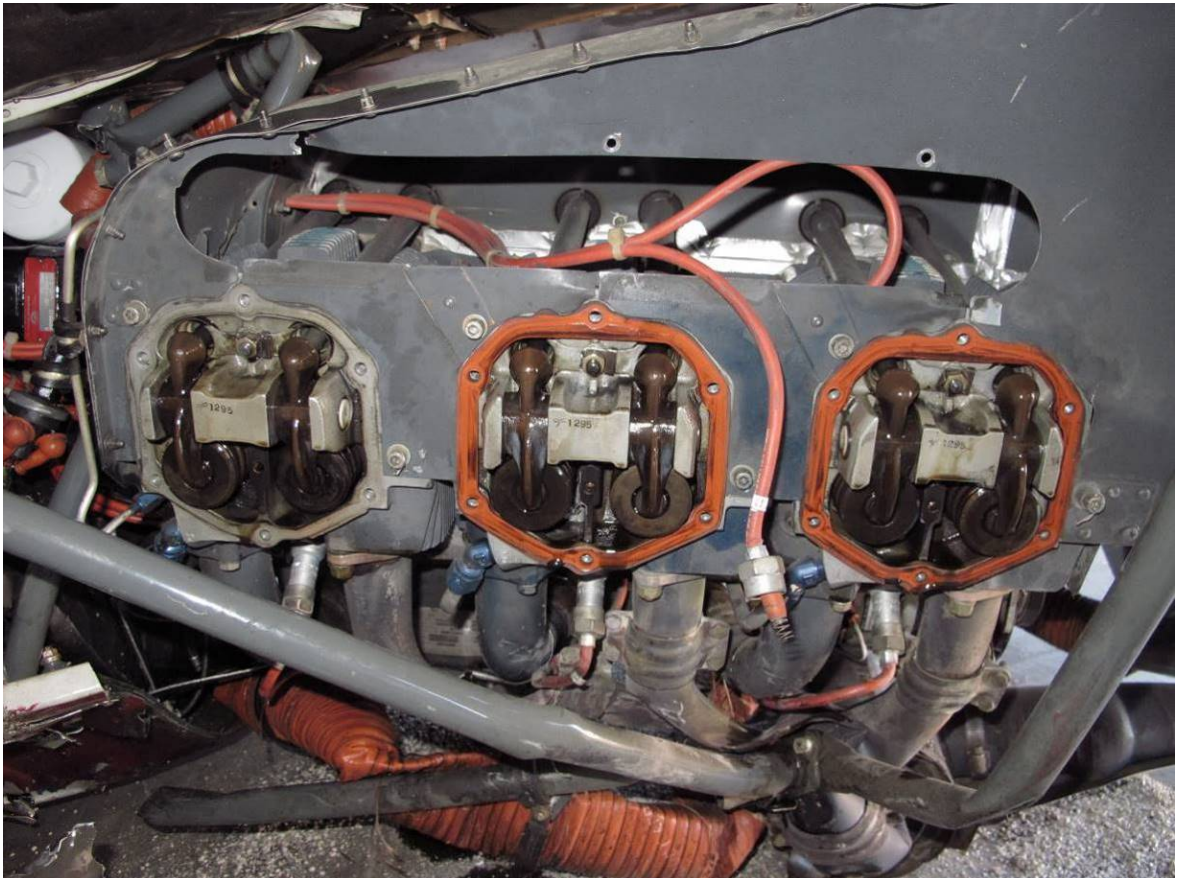


The engine from the right side of the aircraft



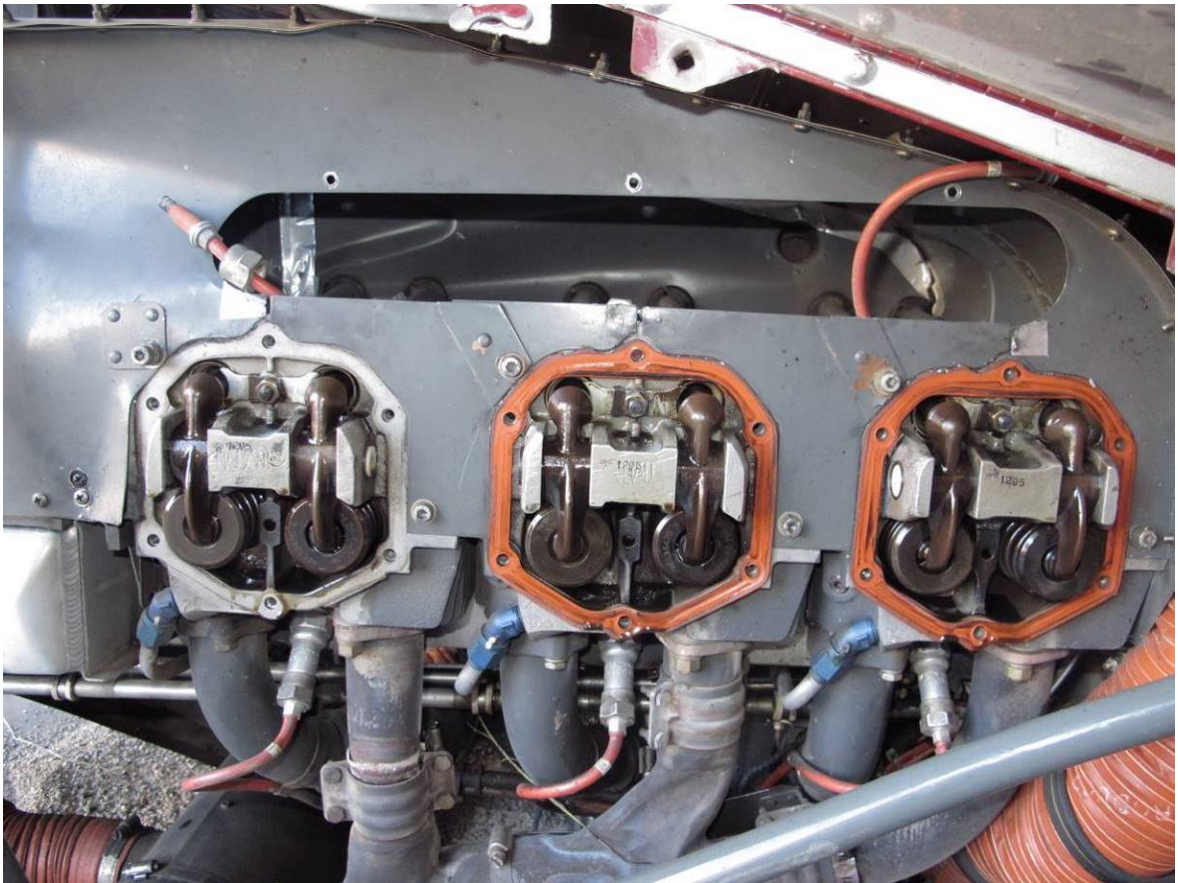


The engine from the rear



The engine from the left side of the aircraft, after valve cover removal



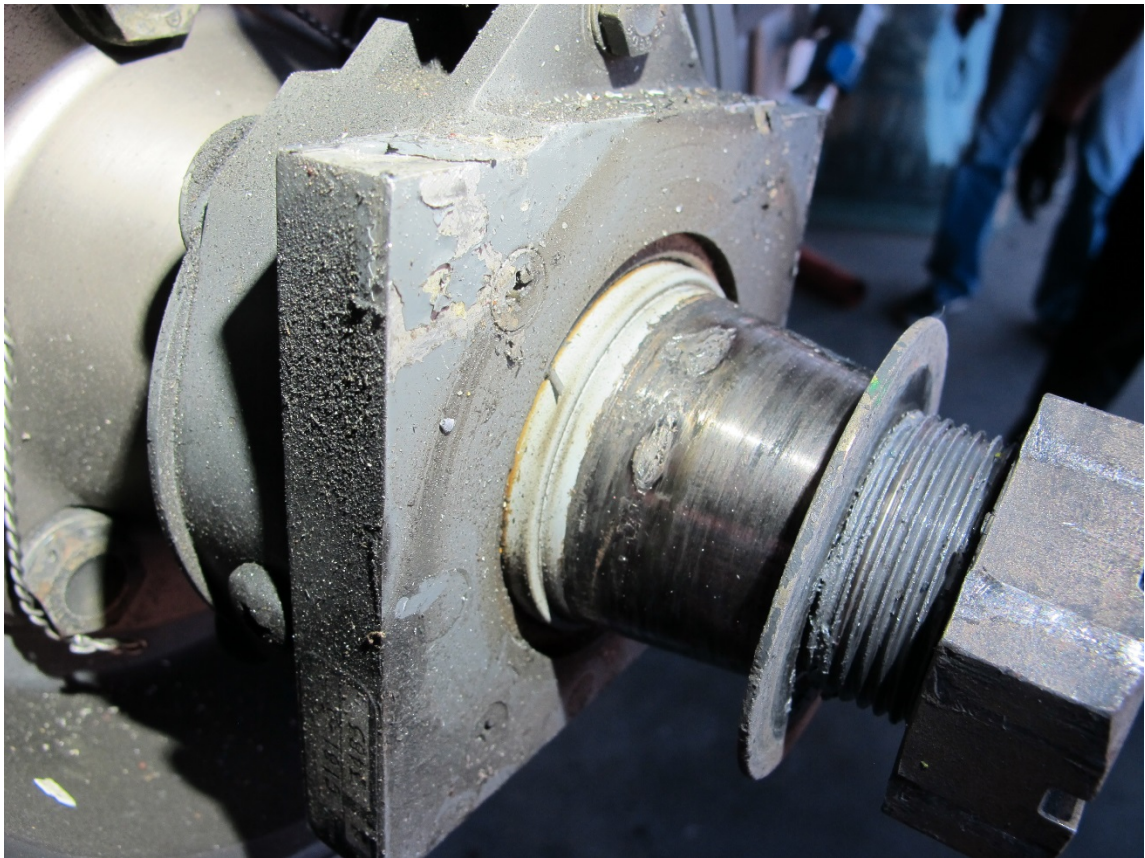


The engine from the right side of the aircraft, after valve cover removal



The engine from the bottom



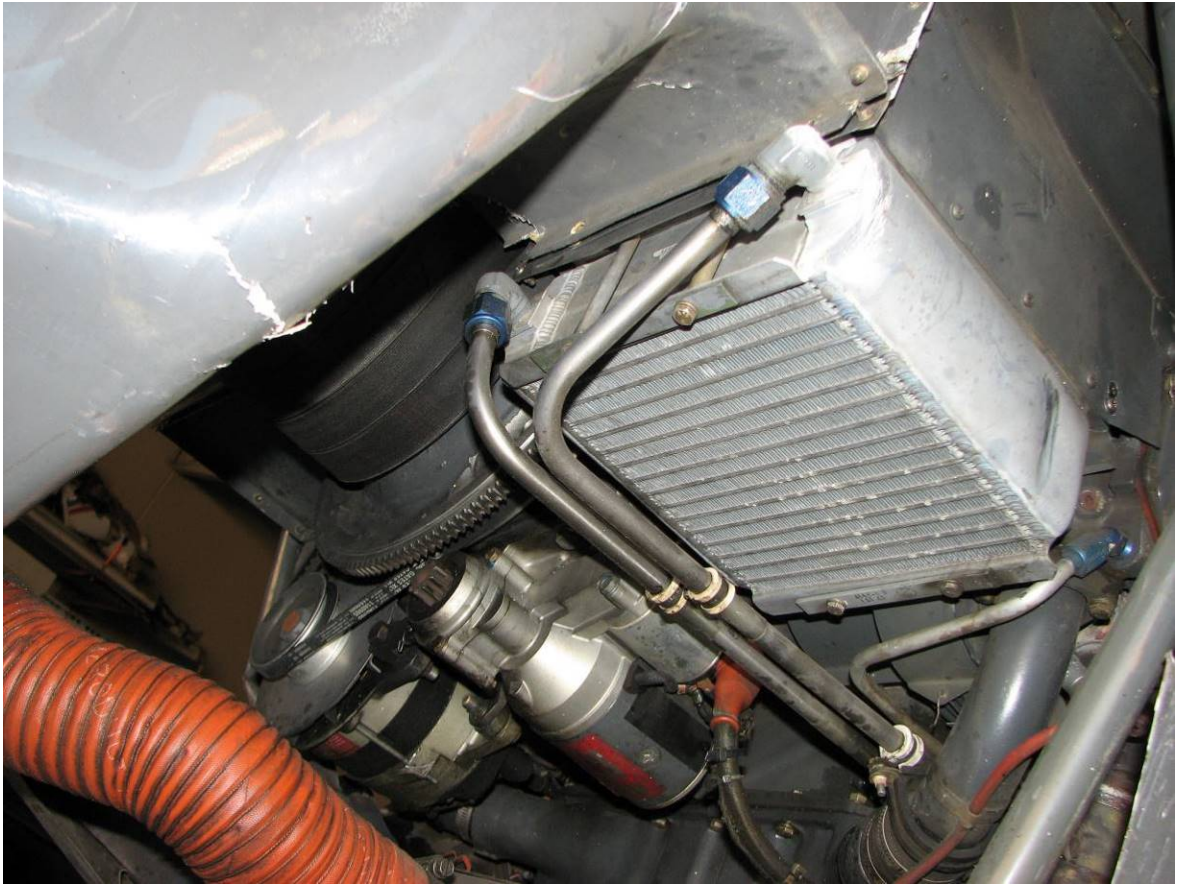


The fanshaft, after fan removal

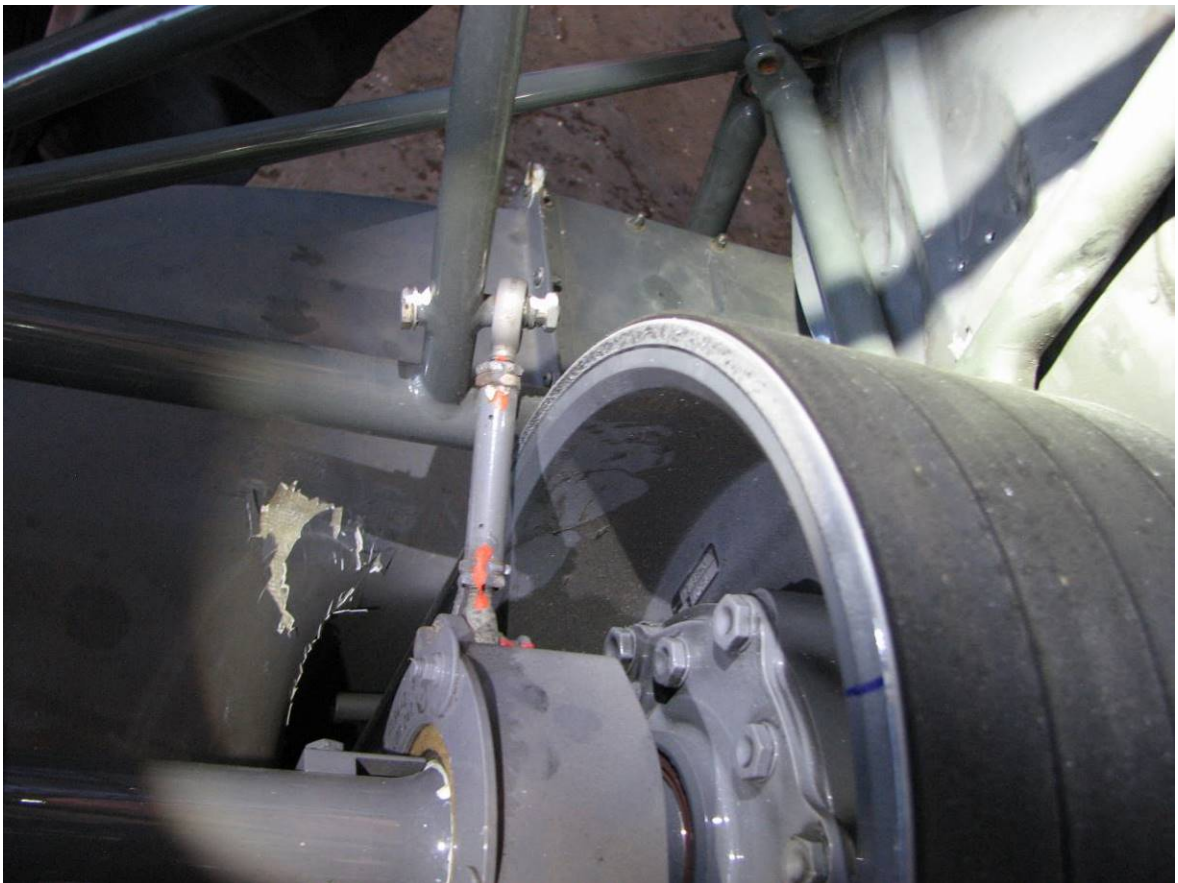


The fan hub conical contact surface, after removal





The starter and alternator



The clutch centering link



Scoring on the clutch centering link

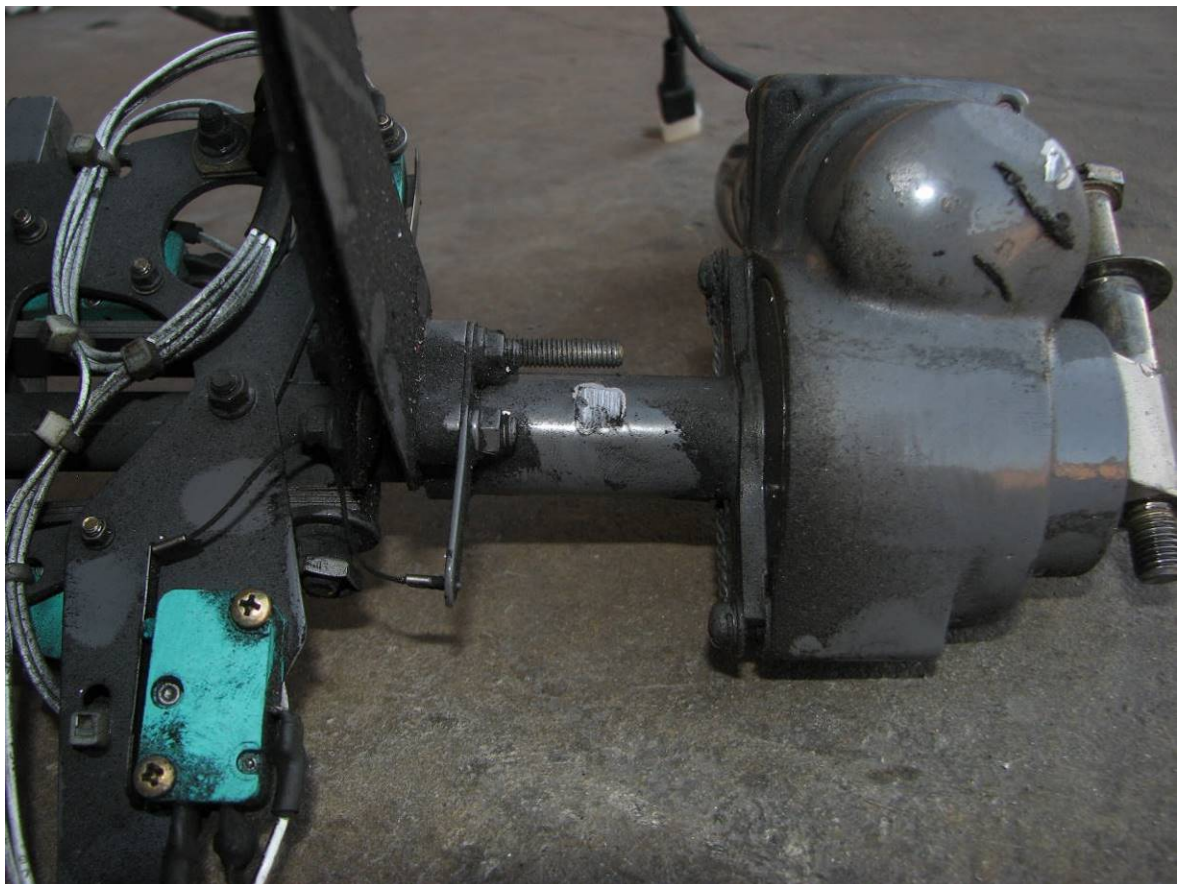


Scoring on the clutch centering link





Scoring on the upper sheave, aft surface



Scoring on the belt tension actuator





Scoring on the belt tension actuator

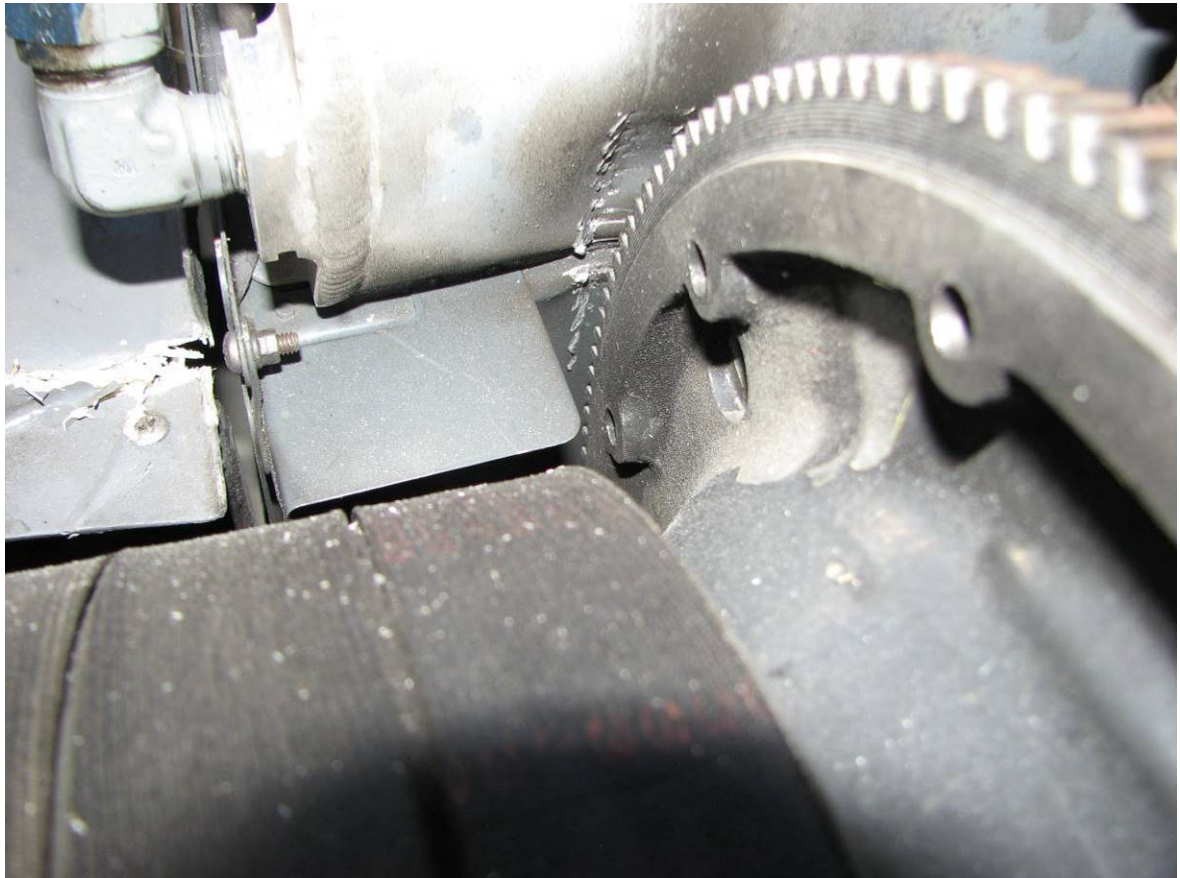


Impact damage to engine cooling fan





Upper spark plugs, after removal



Row of dents in oil cooler and cooling panel





Row of dents in oil cooler and cooling panel



Pieces of magneto drive cushion found in oil sump



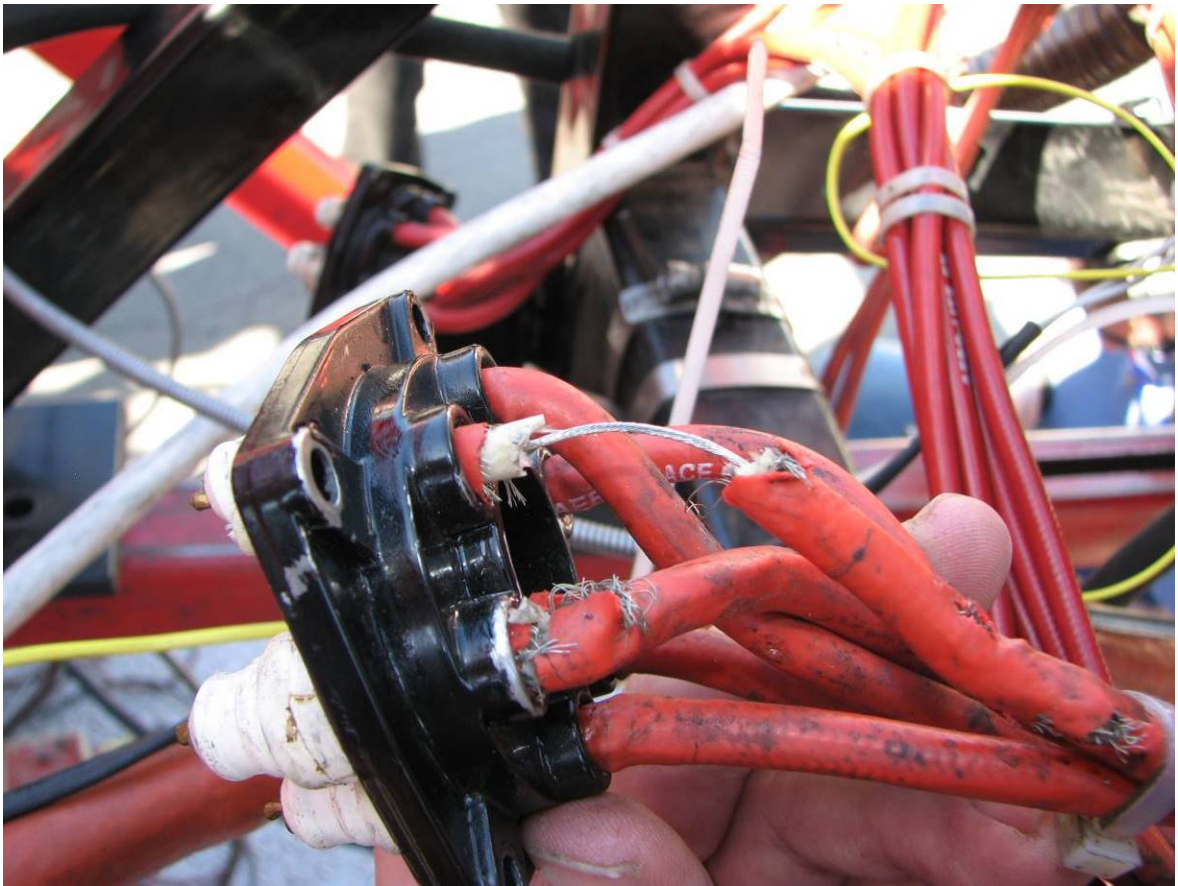


Magneto drive cushion with separated pieces.

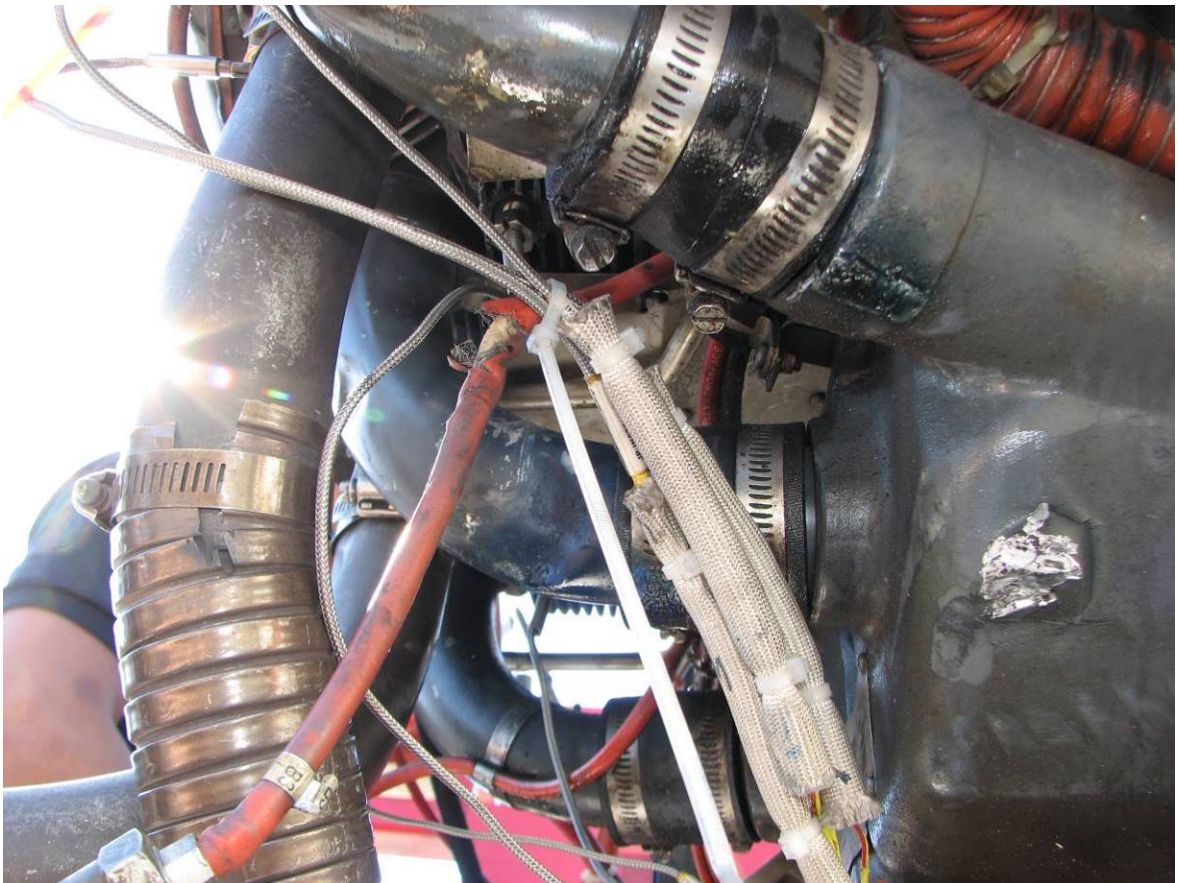


Engine on test stand





Damaged magneto harness



Damaged magneto harness



## DRIVELINE

The V-belts remained in their grooves on both sheaves. The V-belts appeared to have normal wear with no damage.

The grooves on the lower and upper sheaves showed normal wear.

The belt tension actuator was intact and extended 1.1" between the scissor mounting flanges. The upper and lower actuator support bearings rotated smoothly.

The upper sheave rotated on the clutch shaft when moved in a clockwise direction (looking forward) and rotated with the shaft when moved in a counterclockwise direction.

The forward flex coupling was undamaged. Blue oil was visible in the main rotor gearbox sight gauge. Examination of the chip detector revealed no chips. The main rotor driveshaft was rotated by hand more than 360° of the main rotor with no anomalies of the main rotor gearbox.

The droop stops were undamaged. The elastomeric teeter stop for main rotor blade SN 7862 was crushed across the center, the stop for main rotor blade SN 7870 was lightly damaged.

The surfaces of the main rotor hub adjacent to the pitch change boots exhibited arc shaped score marks.

Main rotor blade SN 7862 had red porous material on the leading edge and lower surface near the hub which appeared to match the color and material of the roof tiles of the surrounding houses. It was folded 90° downward approximately 2' outboard of the hub and bowed downward approximately 6' outboard of the hub. There were several chordwise creases in the area of the bow. It was bowed aft (opposite direction of rotation) and downward near the tip with coarse scuff marks on the leading edge and lower surface. A portion of afterbody (skin/honeycomb structure) was crushed and separated from the spar at the tip.

Main rotor blade SN 7870 had scrape marks on the leading edge and lower surface running mostly chordwise with what appeared to be street asphalt on the surface in those areas. A red material was visible in several areas on the blade. The outboard portion of the blade was bowed upward and bent aft (opposite direction of rotation) with wrinkles running spanwise. The "valleys" between the wrinkles exhibited no scrape marks. A small section of afterbody along with the tip cap was separated from the spar at the tip. The inboard portion of the blade was slightly bowed upward with chordwise wrinkles throughout.

The intermediate flex coupling was bent and twisted with one flange arm disconnected. The surface of the disconnect was angular and jagged.

The tail rotor drive shaft was disconnected in two places. The surface of the disconnects were angular and jagged. The forward disconnect was slightly twisted and the aft disconnect was flattened. The tail rotor drive shaft damper bearing housing was separated from the bearing and the support bracket was separated from the tailcone bulkhead. The damper bearing remained on the drive shaft and rotated smoothly by hand. The friction at the linkage pivots felt normal.

The aft flex coupling was bent and the flexplate was disconnected from the tail rotor gearbox input yoke. The surface of the disconnects were angular and jagged.

The tail rotor gearbox was separated from the tailcone bulkhead with a small portion of bulkhead remaining attached to the gearbox. The tail rotor gearbox input shaft was rotated by hand more than 360° with no anomalies. Blue oil was visible in the sight glass. The tail rotor gearbox chip detector was removed and examined. No chips were present.

Tail rotor blade SN 2330 was disconnected near the root and at the tip. The surfaces of the disconnects were angular and jagged. The leading and trailing edges were deformed. There were scuff marks along with red porous material throughout the blade surface which appeared to match the color and material of the roof tiles of the surrounding houses. The tip of the blade was not recovered.

Tail rotor blade SN 2333 was bent near the root with a short fracture at the leading edge. The surface of the fracture was angular and jagged. The leading and trailing edges were deformed. There were scuff marks along with red porous material on the leading edge near the tip which appeared to match the color and material of the roof tiles of the surrounding houses.



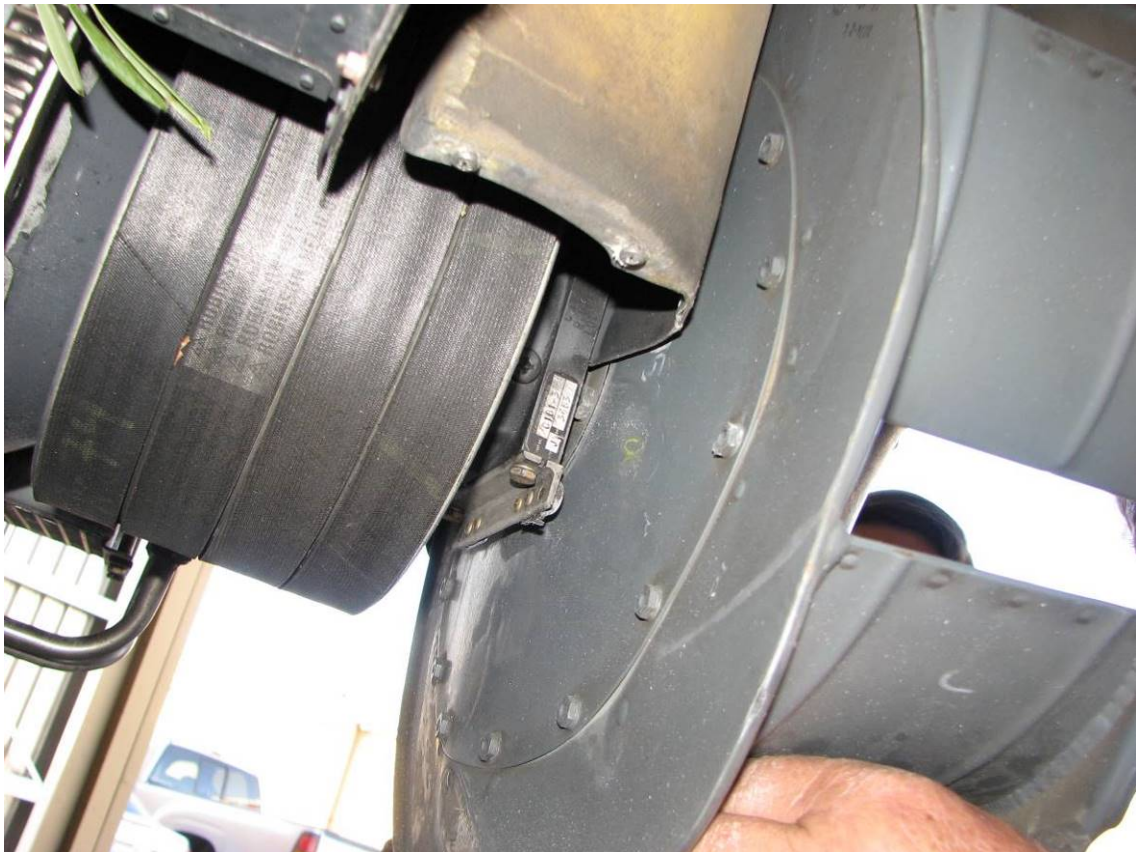


The V-belts, from the left side of the aircraft



The V-belts at the upper sheave, from the right side of the aircraft





The V-belts at the lower sheave

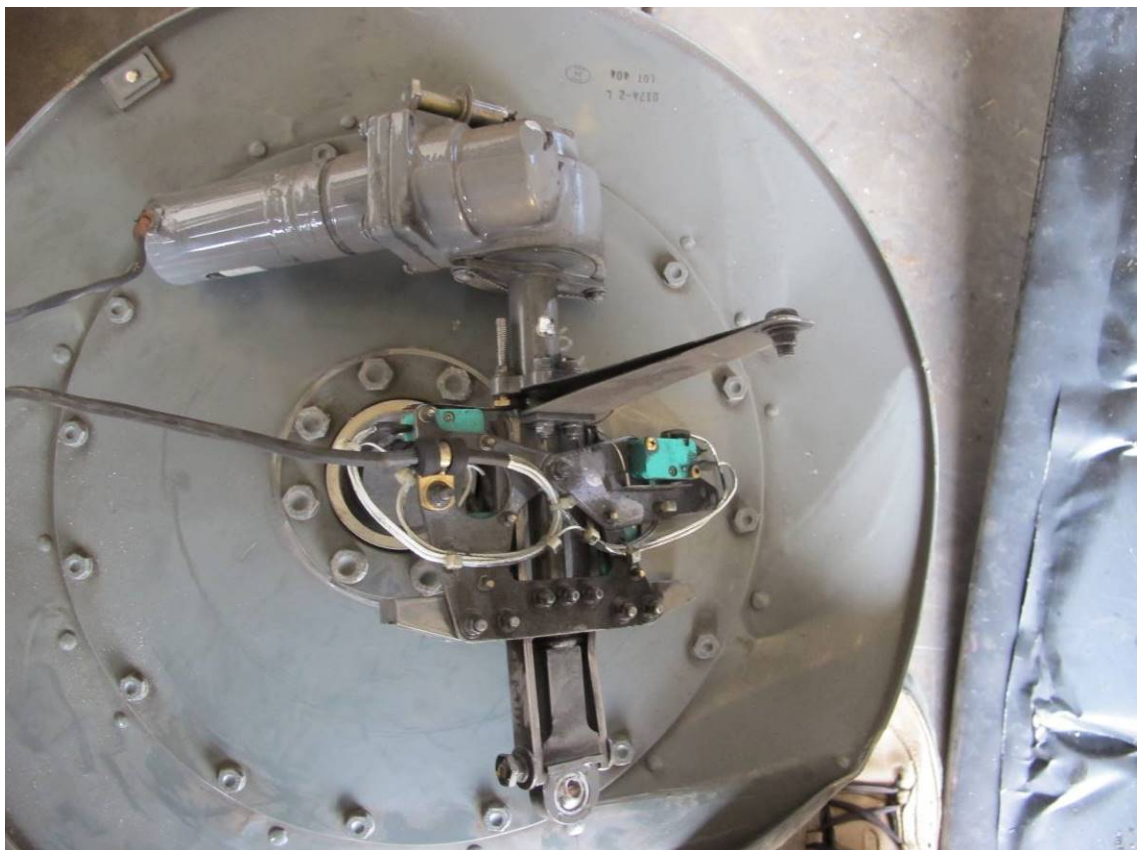


The V-belts, after removal from the aircraft

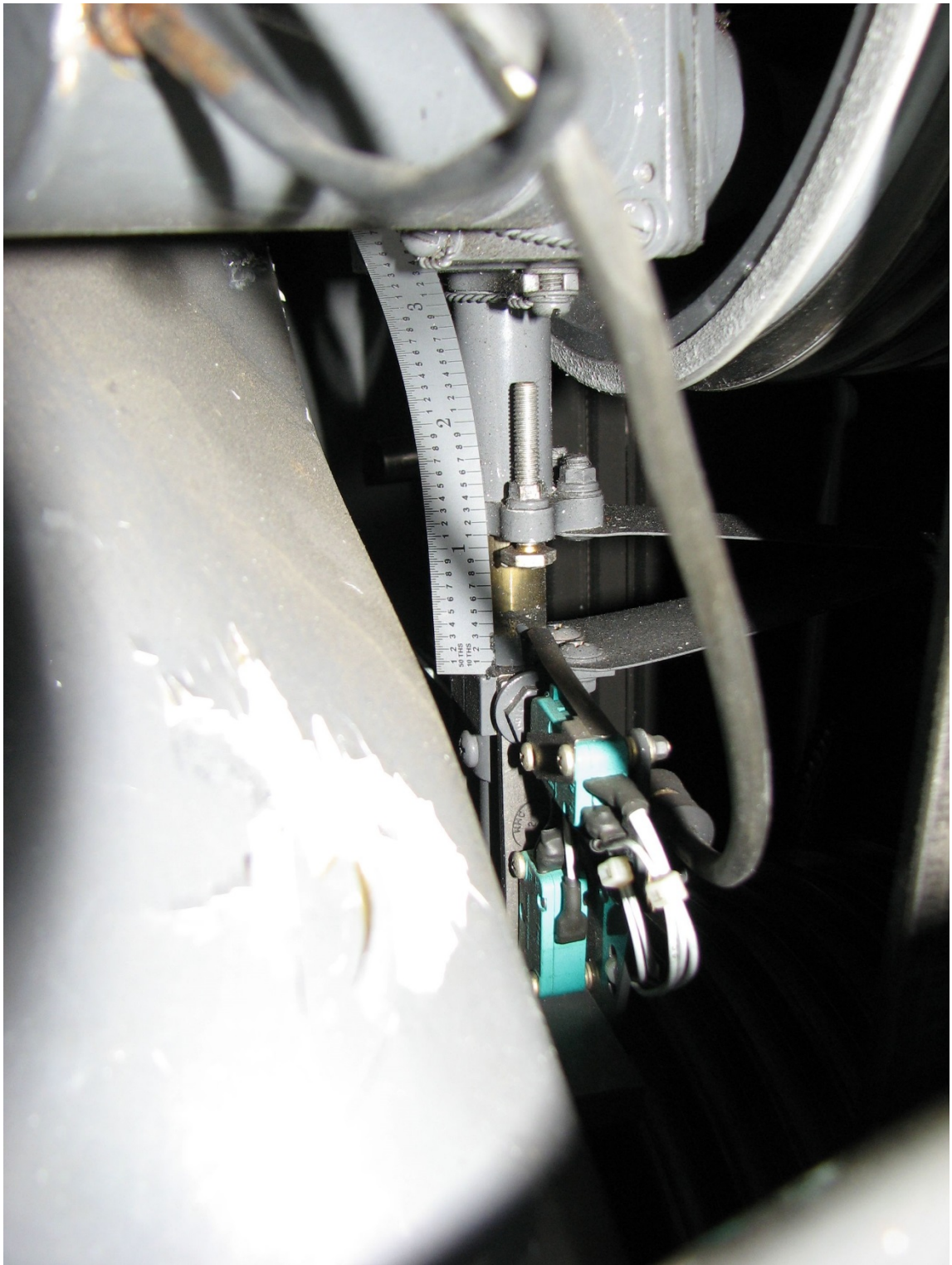




The lower sheave grooves



The belt tension actuator

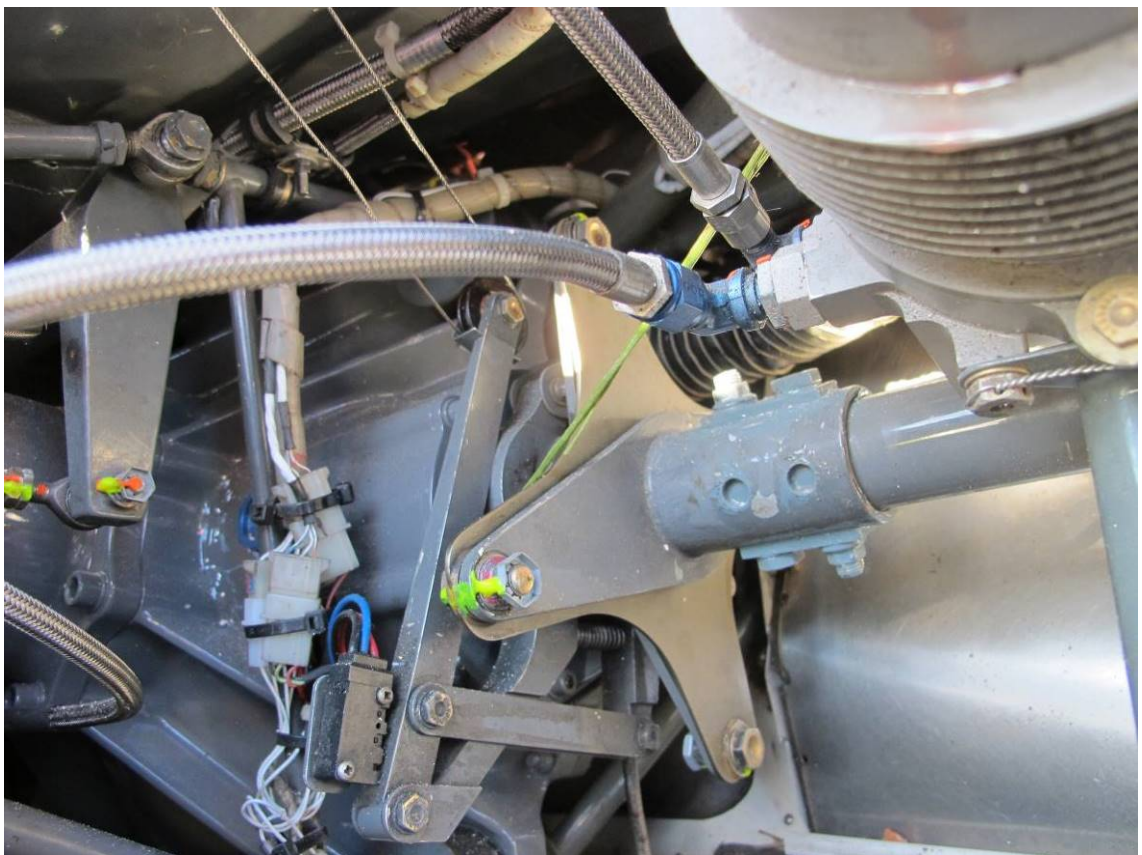


The extension of the belt tension actuator



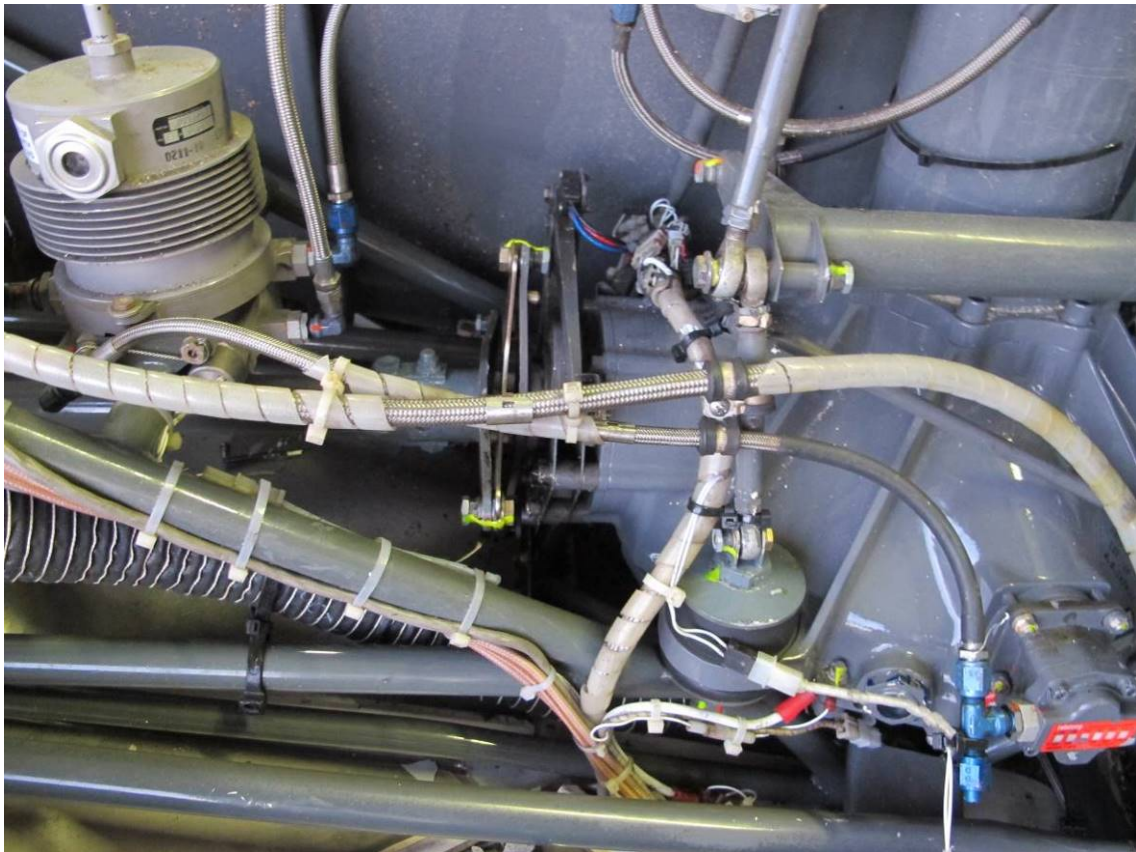


The upper sheave grooves

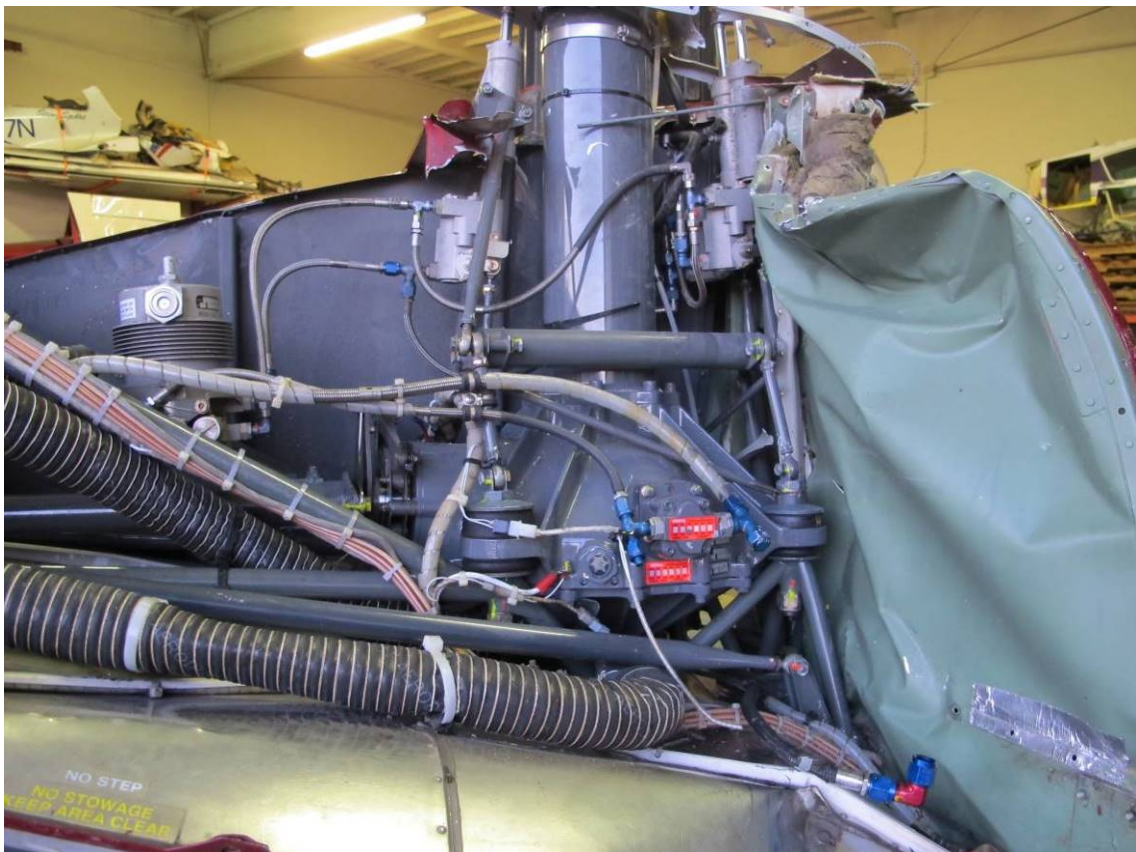


The forward flex coupling



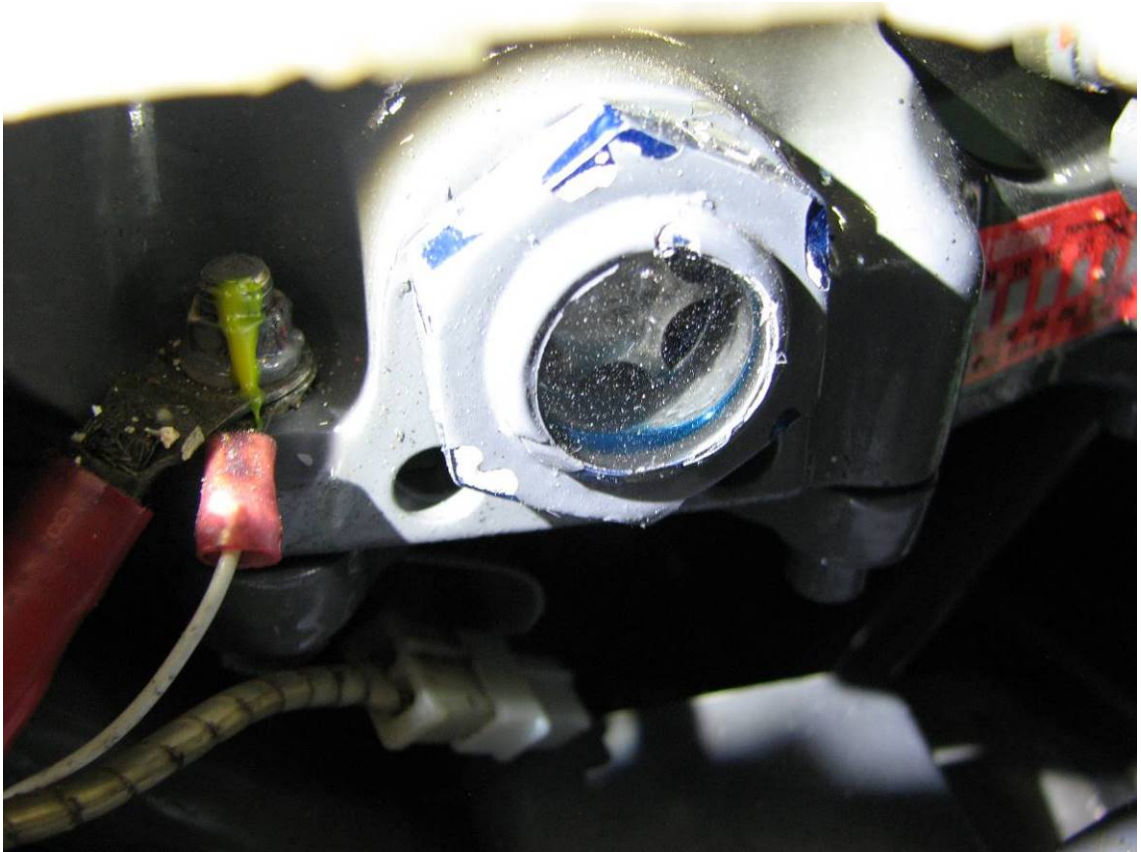


The forward flex coupling



The main rotor gearbox





Oil visible in the main rotor gearbox sight glass



The main rotor gearbox chip detector

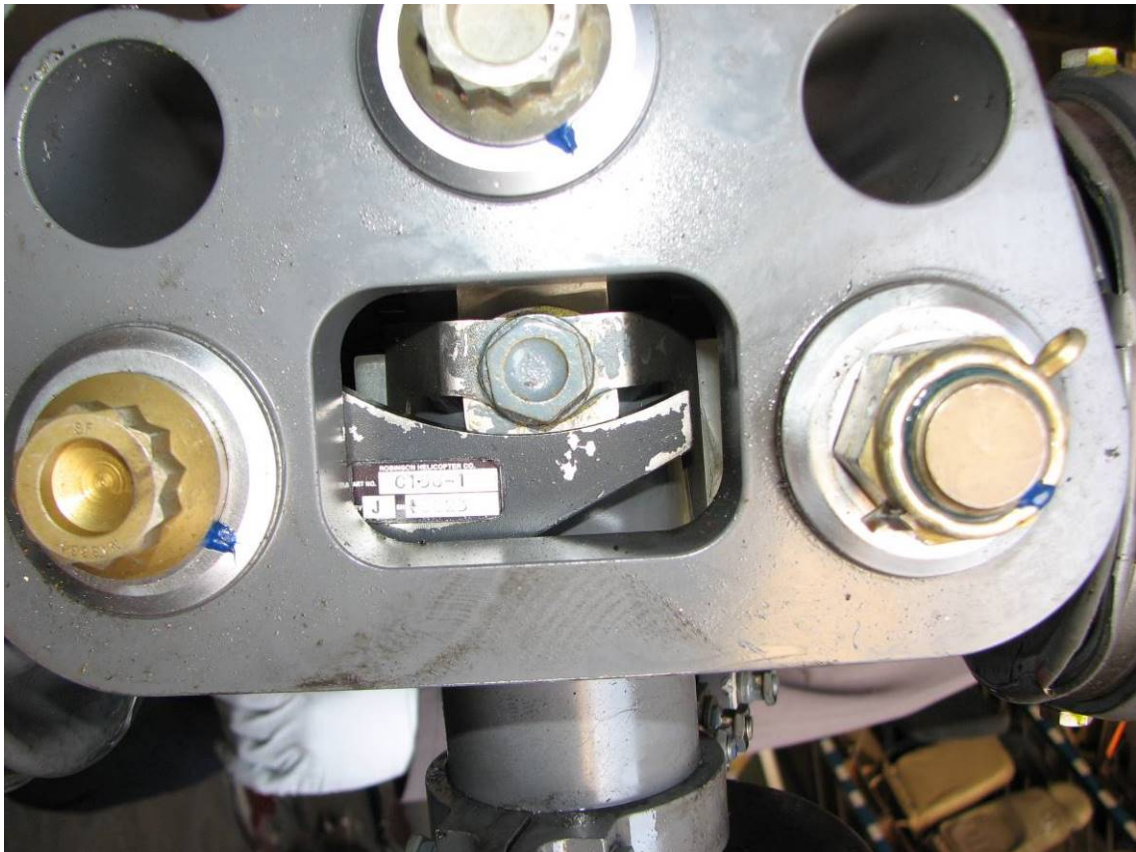


The lower portion of the main rotor mast

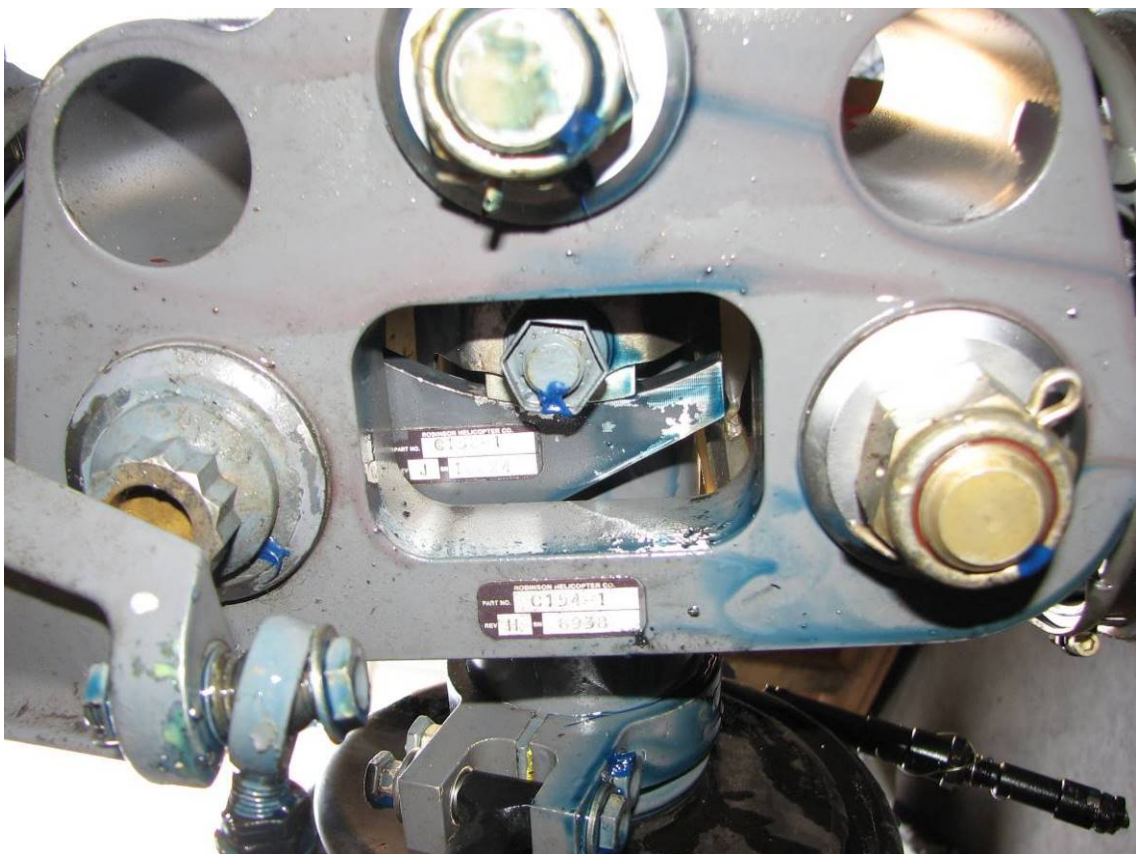


The main rotor hub



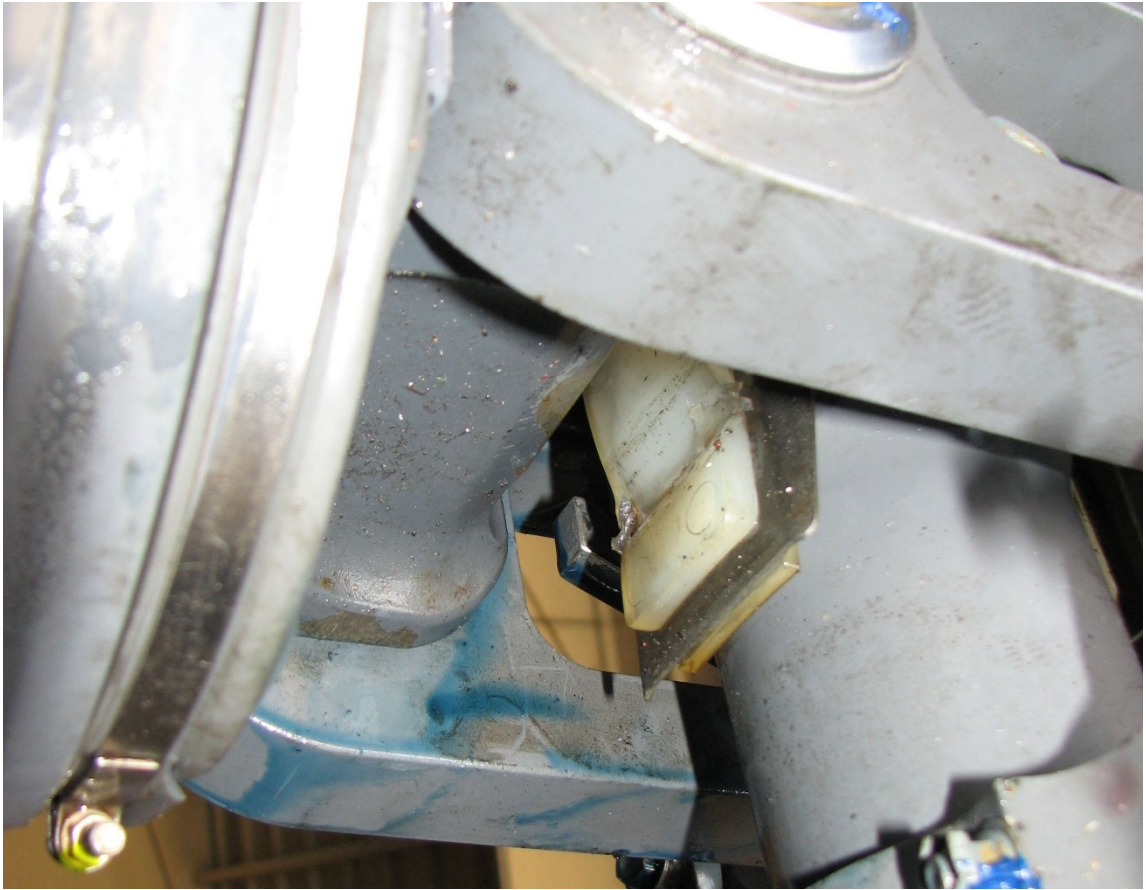


The droop stop for main rotor blade SN 7862

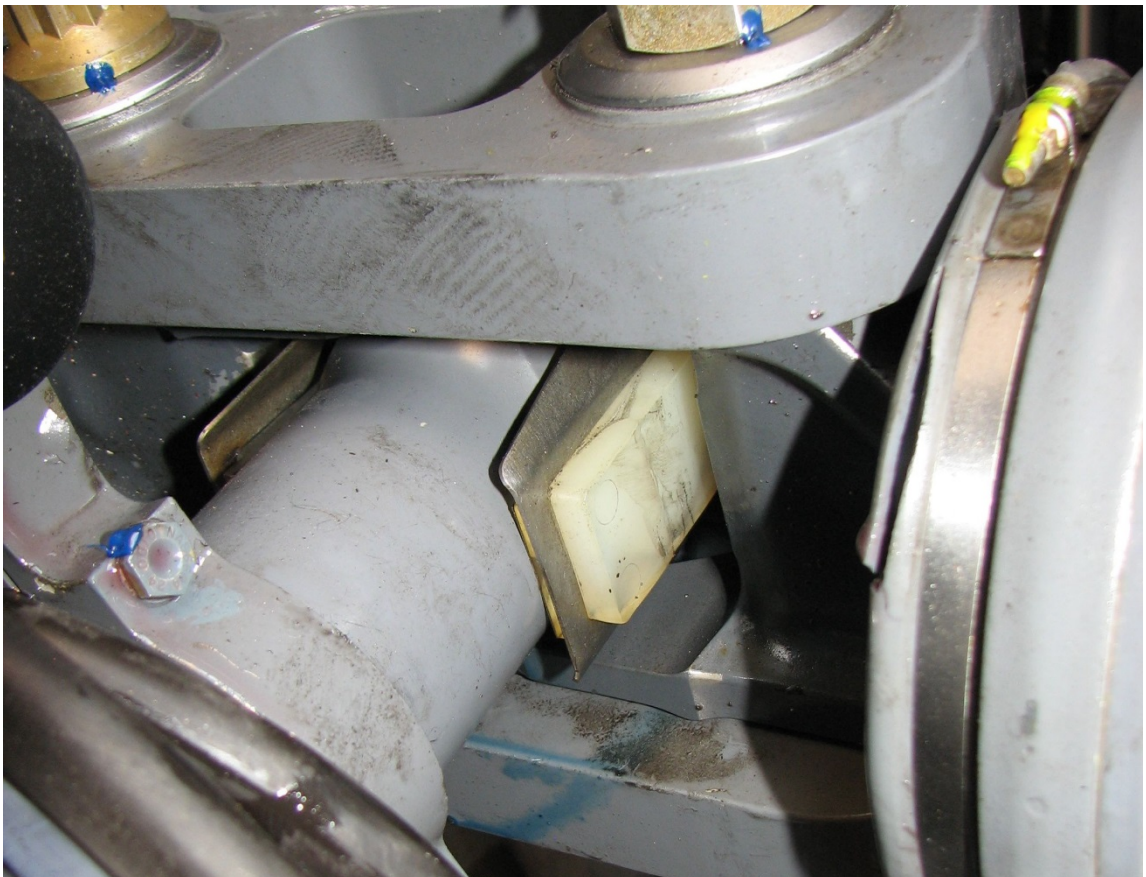


The droop stop for main rotor blade SN 7870





The elastomeric teeter stop for main rotor blade SN 7862



The elastomeric teeter stop for main rotor blade SN 7870





The main rotor hub, inboard of main rotor blade SN 7862



The main rotor hub, inboard of main rotor blade SN 7870





Main rotor blade SN 7862 at the accident site



Main rotor blade SN 7862 at the accident site





Main rotor blade SN 7862 at the accident site



The main rotor blades after being cut during wreckage recovery





Main rotor blade SN 7862 after recovery (at rear in photo)



Main rotor blade SN 7862 root





Main rotor blade SN 7862, lower surface inboard end



Main rotor blade SN 7862, lower surface inboard end





Main rotor blade SN 7862, lower surface, center section

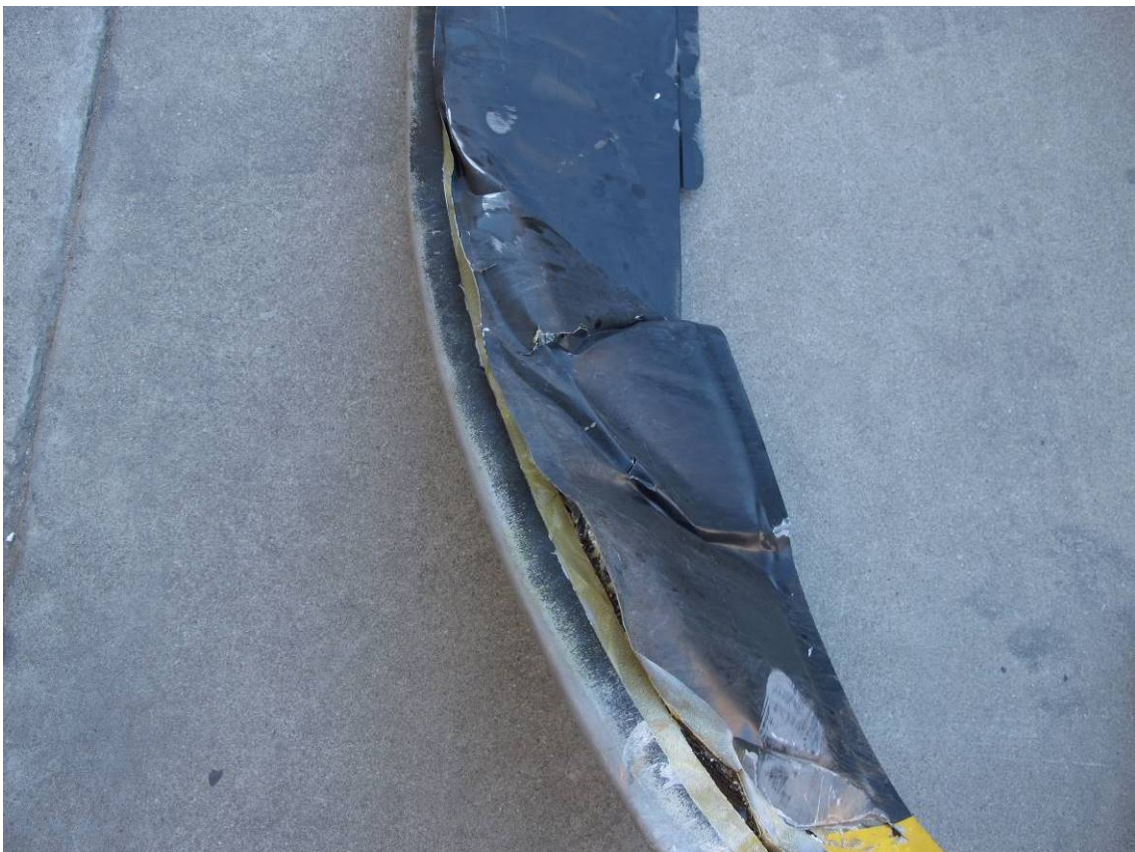


Main rotor blade SN 7862, lower surface, center section (at left in photo)





Main rotor blade SN 7862, lower surface, outboard portion



Main rotor blade SN 7862, lower surface, at tip





Main rotor blade SN 7862, lower surface, at tip (detached afterbody is being held in place by hand)



Main rotor blade SN 7862, detached portion at tip, lower surface





Main rotor blade SN 7862, detached portion at tip, upper surface



Main rotor blade SN 7862, upper surface, near tip



Main rotor blade SN 7862, leading edge, near tip



Main rotor blade SN 7862, upper surface (at rear in photo)





Main rotor blade SN 7862, upper surface, center portion



Main rotor blade SN 7862, upper surface, center portion





Main rotor blade SN 7862, upper surface, inboard end

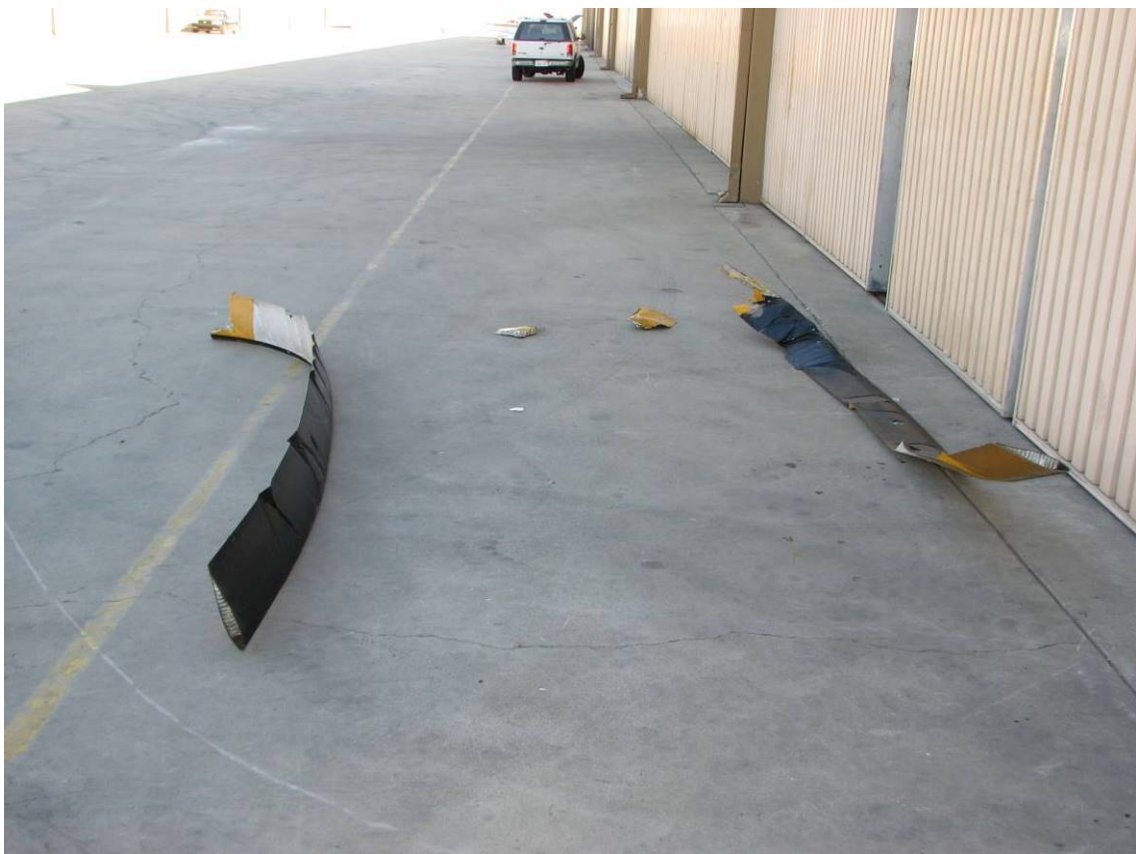


Main rotor blade SN 7870 at the accident site





Main rotor blade SN 7870 after recovery (in foreground in photo)



Main rotor blade SN 7870 after recovery (at left in photo)



Main rotor blade SN 7870, lower surface, inboard section



Main rotor blade SN 7870, lower surface, outboard section





Main rotor blade SN 7870, lower surface, at tip



Main rotor blade SN 7870. Lower surface, at tip





Main rotor blade SN 7870, lower surface of detached section at tip



Scoring on main rotor blade SN 7870 lower surface, near tip





Scoring on main rotor blade SN 7870 lower surface, near tip



Leading edge of main rotor blade SN 7870, (in foreground in photo)



Leading edge of main rotor blade SN 7870, (in foreground in photo)

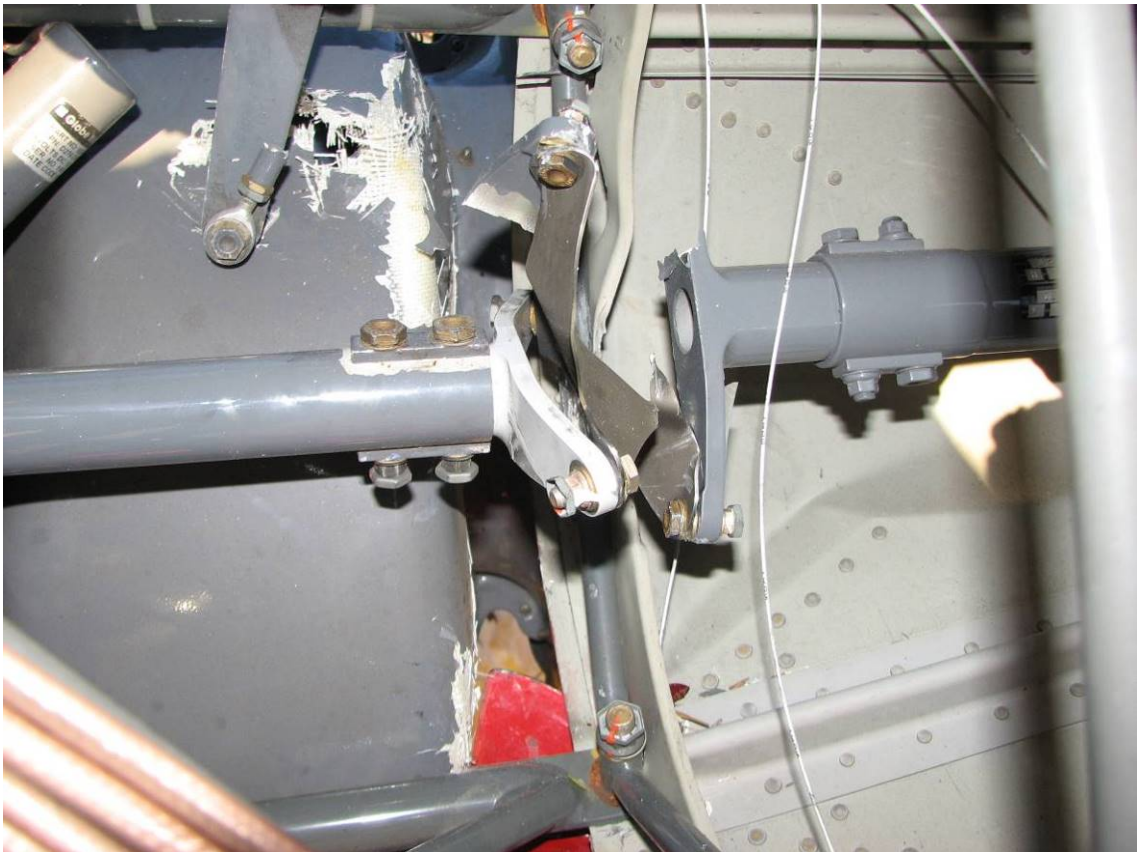


Upper surface of main rotor blade SN 7870





Upper surface of main rotor blade SN 7870



Intermediate flex coupling





The intermediate flex coupling



The tail rotor driveshaft (in foreground)





The tail rotor driveshaft, forward section



The tail rotor driveshaft, middle section



The tail rotor driveshaft, aft section



The forward separation of the tail rotor driveshaft





The aft separation of the tail rotor driveshaft



The tail rotor driveshaft damper bearing housing and support



The tail rotor driveshaft damper bearing



The aft flex coupling, forward portion



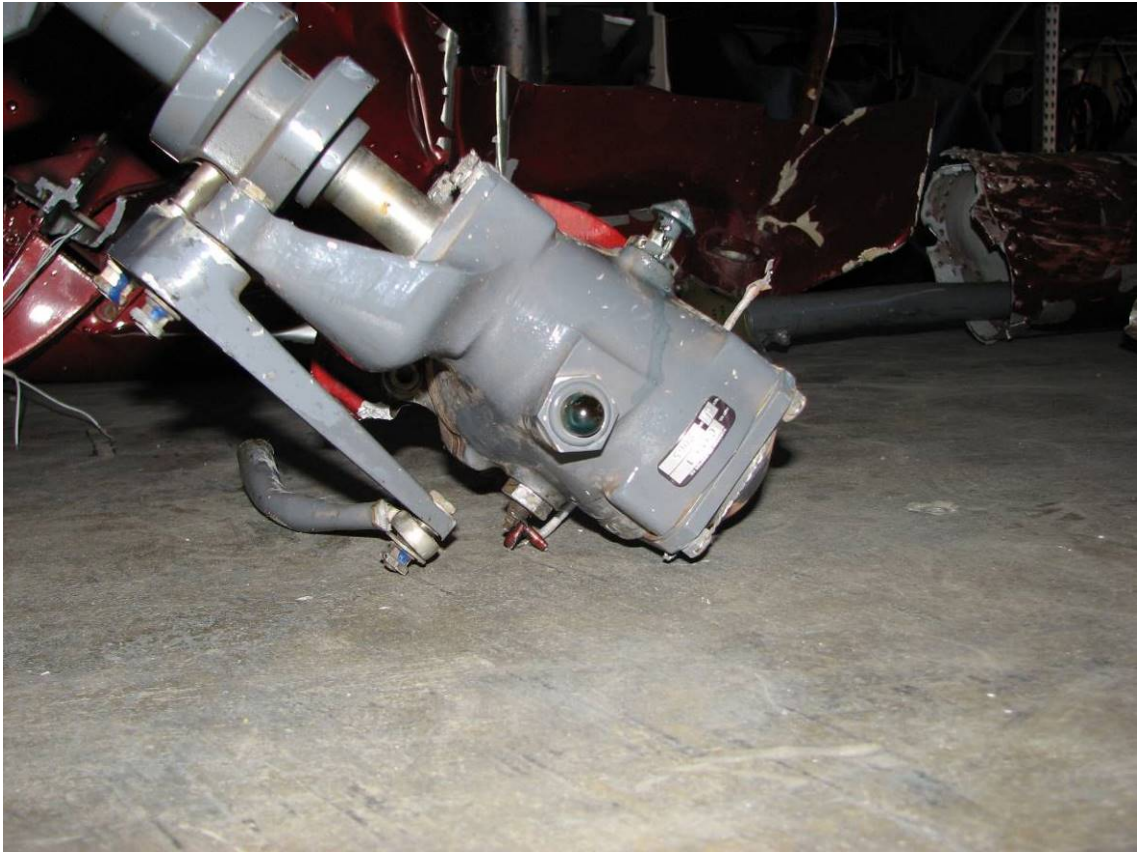


The aft flex coupling, aft portion



The tail rotor gearbox





### The tail rotor gearbox



### The tail rotor gearbox





The tail rotor gearbox chip detector



The tail rotor hub





The tail rotor



The tail rotor





The inboard portion of tail rotor blade SN 2330



The inboard portion of tail rotor blade SN 2330





The center portion of tail rotor blade SN 2330



The center portion of tail rotor blade SN 2330



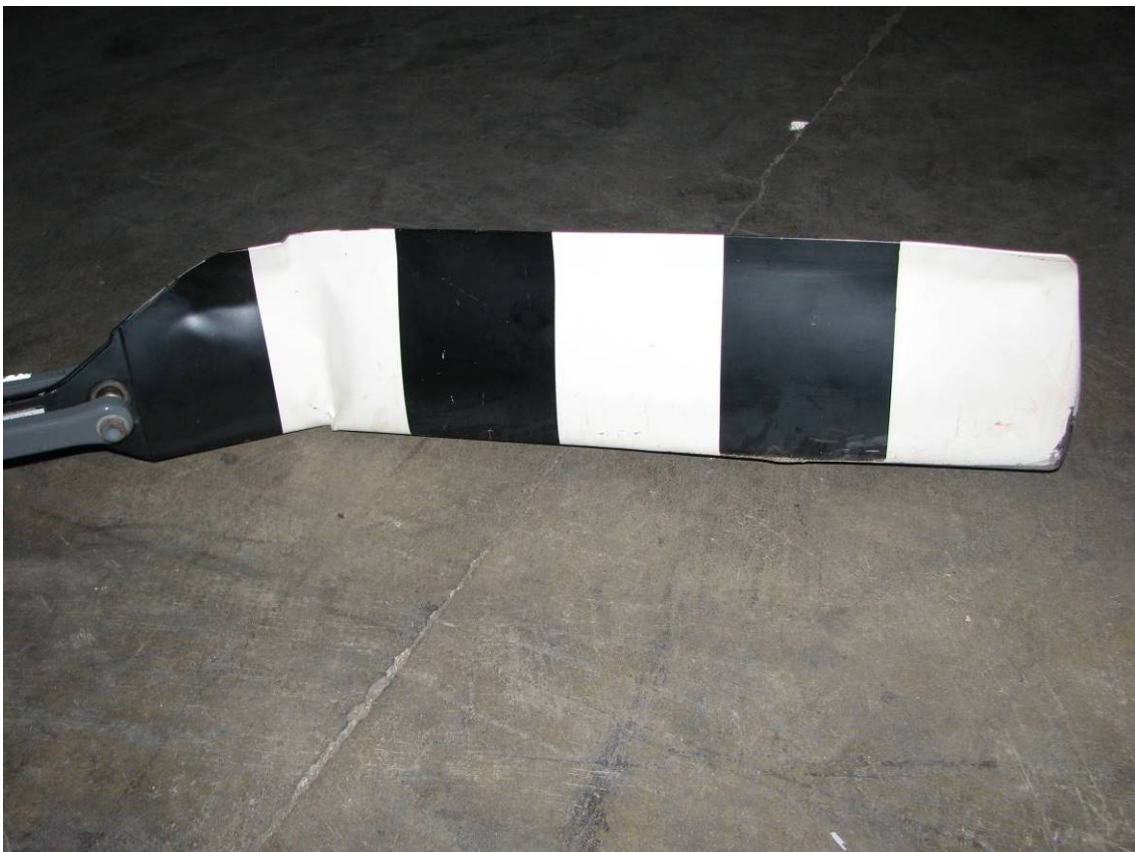


Above and below: The center portion of tail rotor blade SN 2330





Tail rotor blade SN 2333, from the aircraft right side



Tail rotor blade SN 2333, from the aircraft left side





Tail rotor blade SN 2333, leading edge



Tail rotor blade SN 2333, trailing edge

## **FLIGHT CONTROLS**

The flight control system had discontinuities at the locations indicated on the diagrams on pages 12.2 and 12.13. The disconnects are shown individually in the photographs that follow. No evidence of pre-impact failures of the flight control system was found.

The hydraulic control servos could not be checked for freedom of movement due to lack of freedom in the surrounding control tubes.

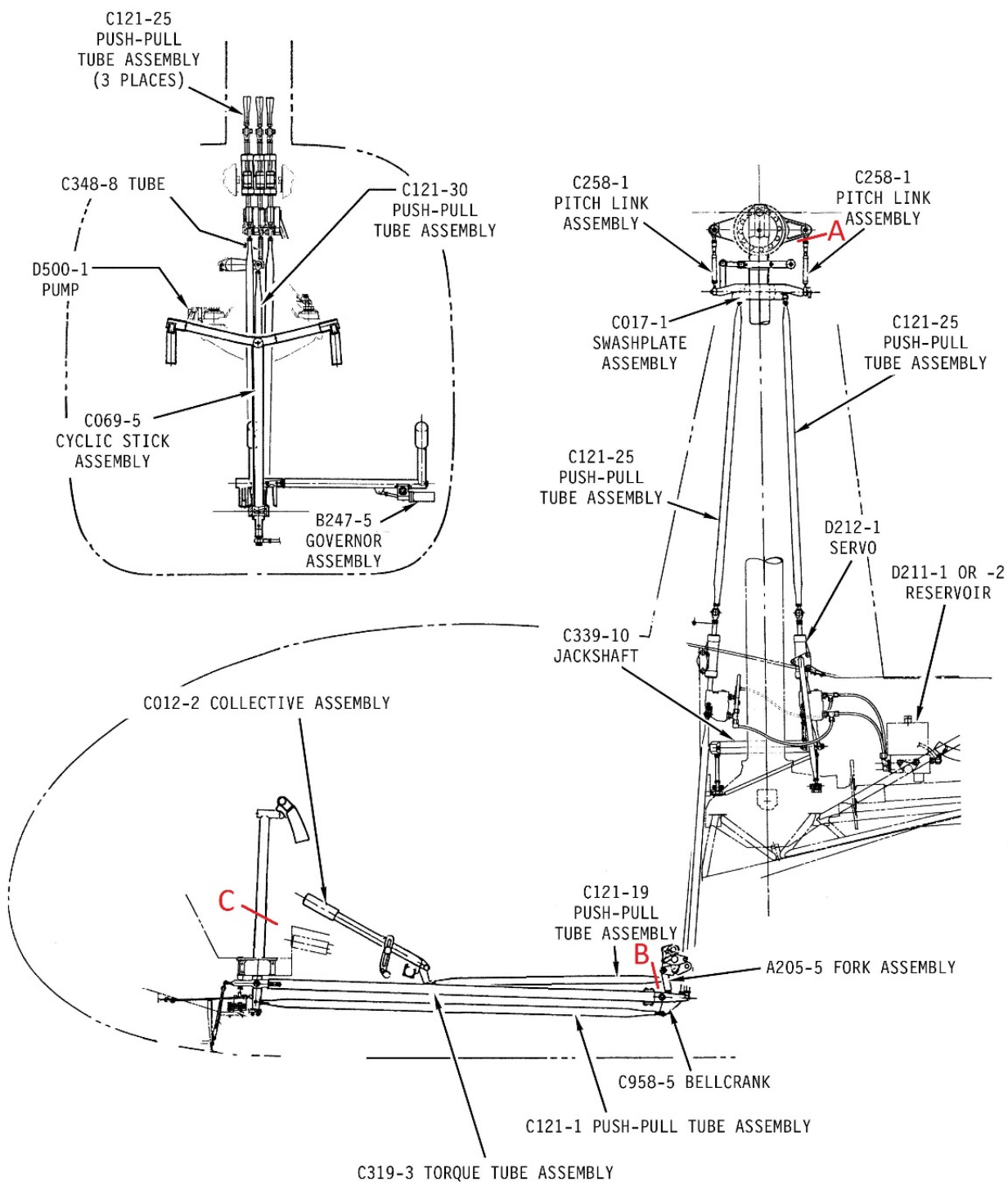
There was red fluid visible in the hydraulic reservoir sight glass.

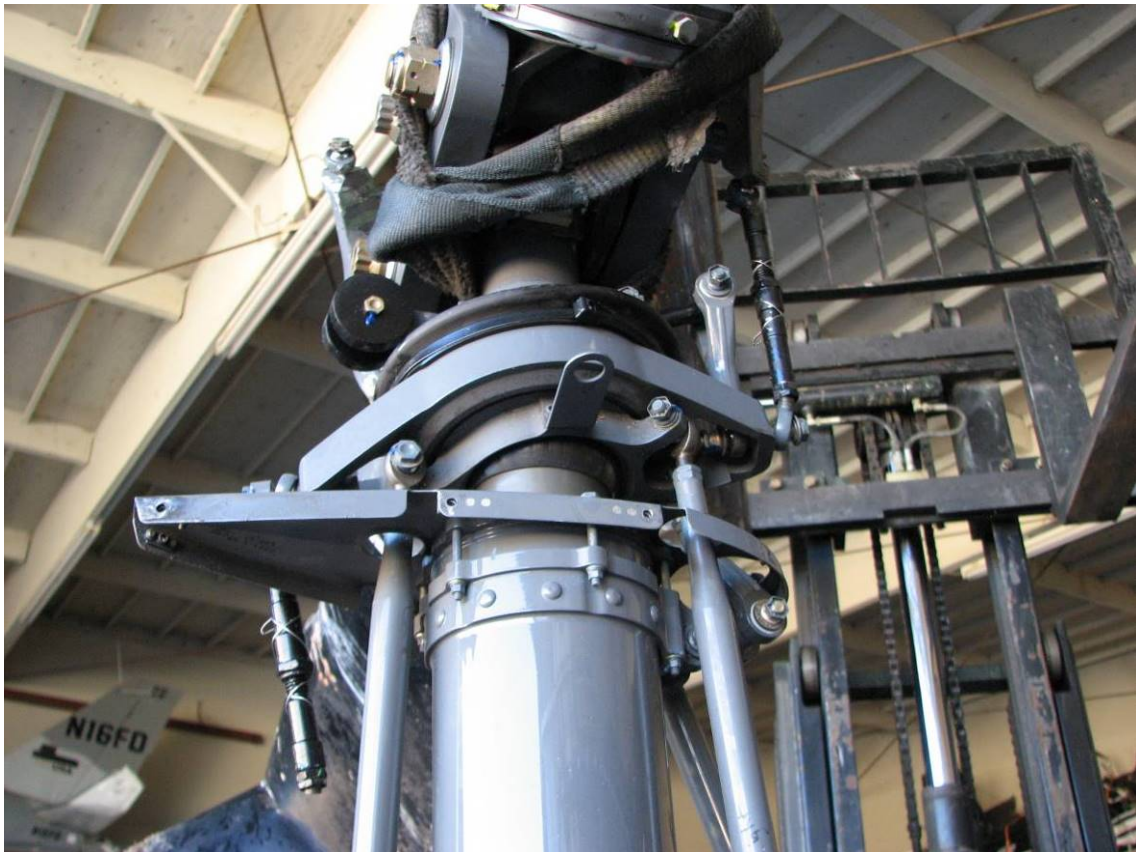
The center section of the C121-17 tail rotor push pull tube was not located.

The tail rotor pitch change slider was free to slide along the tail rotor gearbox output shaft.



# R44 HYDRAULIC MAIN ROTOR FLIGHT CONTROLS





Controls at the lower and upper swashplate

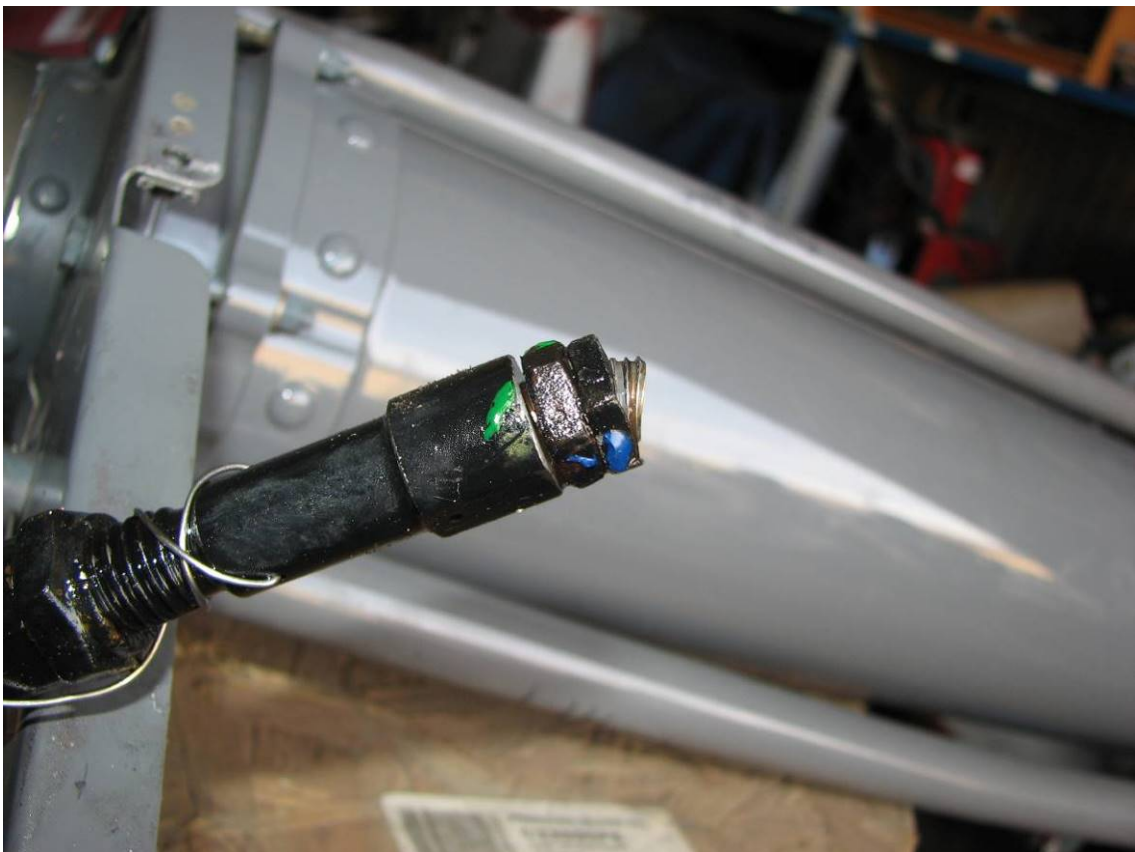


Controls at the lower swashplate





Disconnect A in the pitch link for main rotor blade SN 7862



Disconnect A in the pitch link for main rotor blade SN 7862

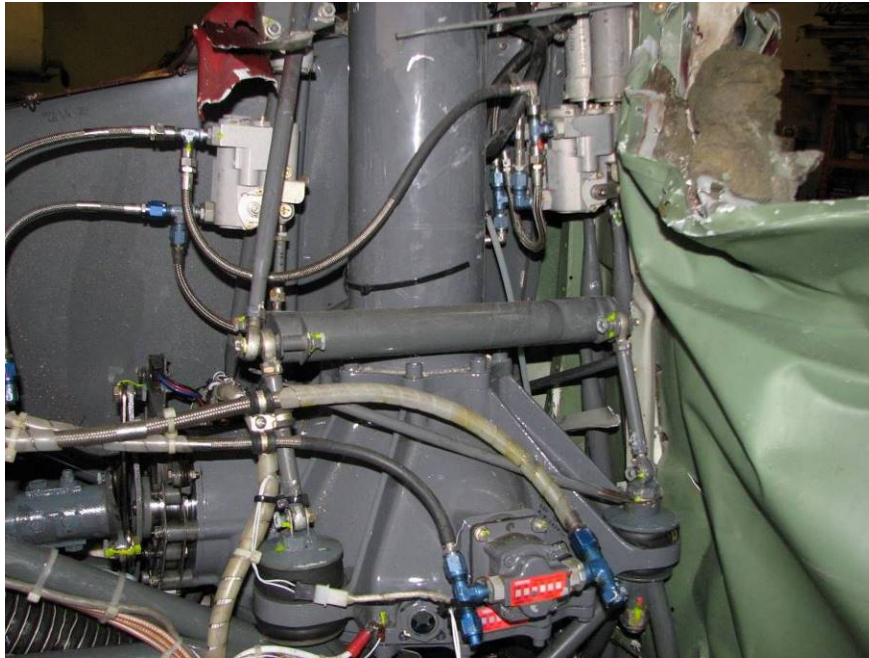


Disconnect A in the pitch link for main rotor blade SN 7862

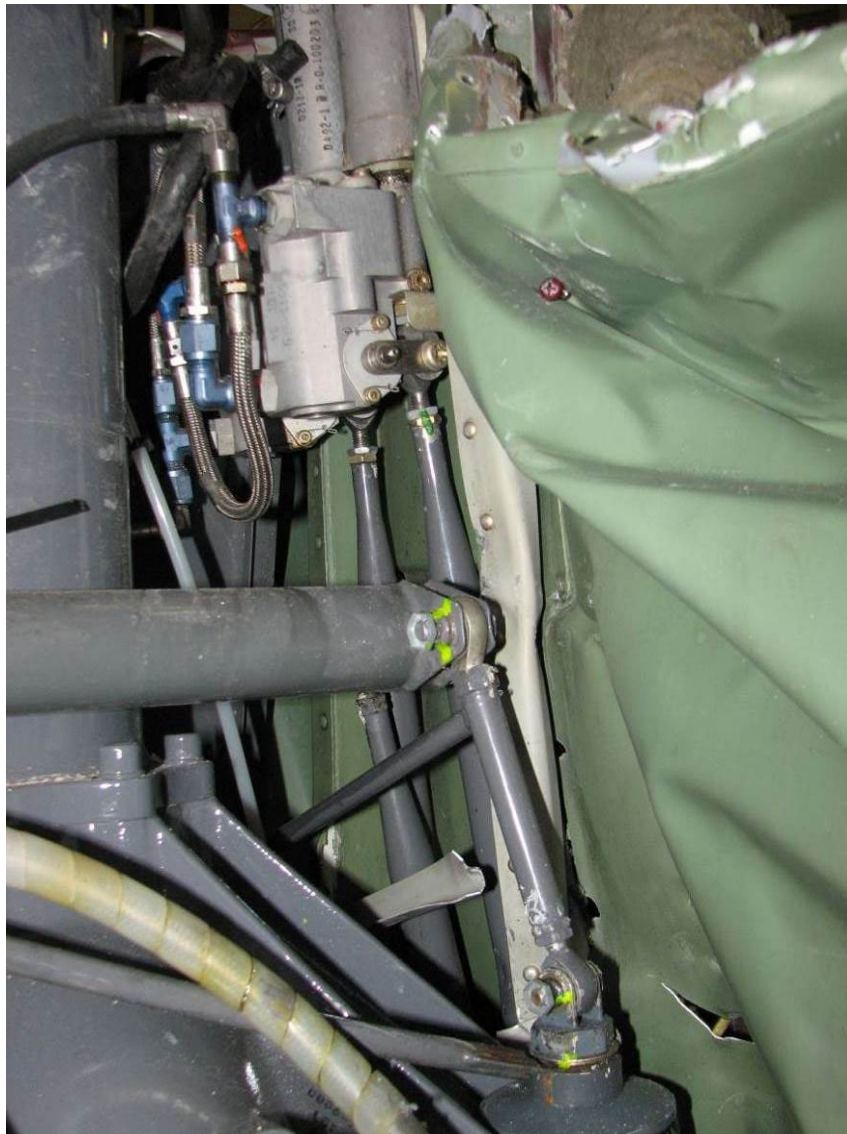


The hydraulic servos and controls at the main rotor gearbox

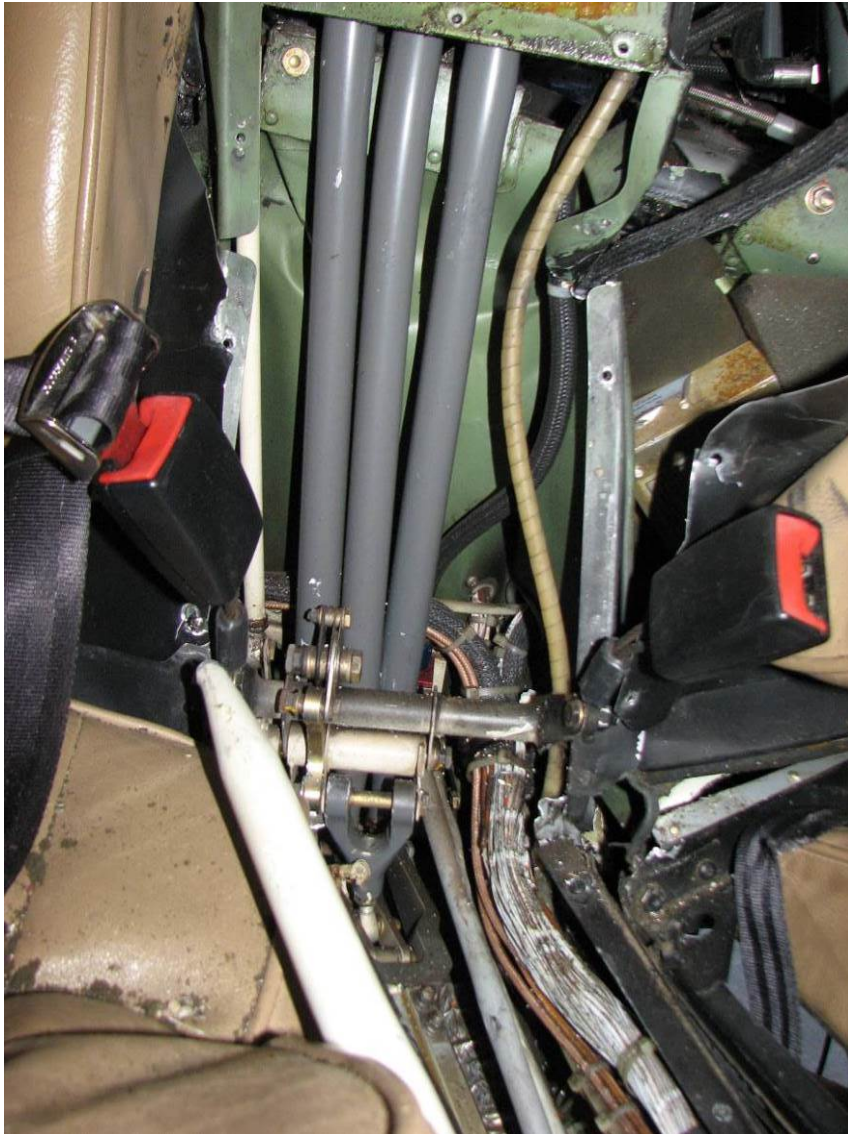




The hydraulic servos and controls at the main rotor gearbox



The hydraulic servos and controls at the main rotor gearbox

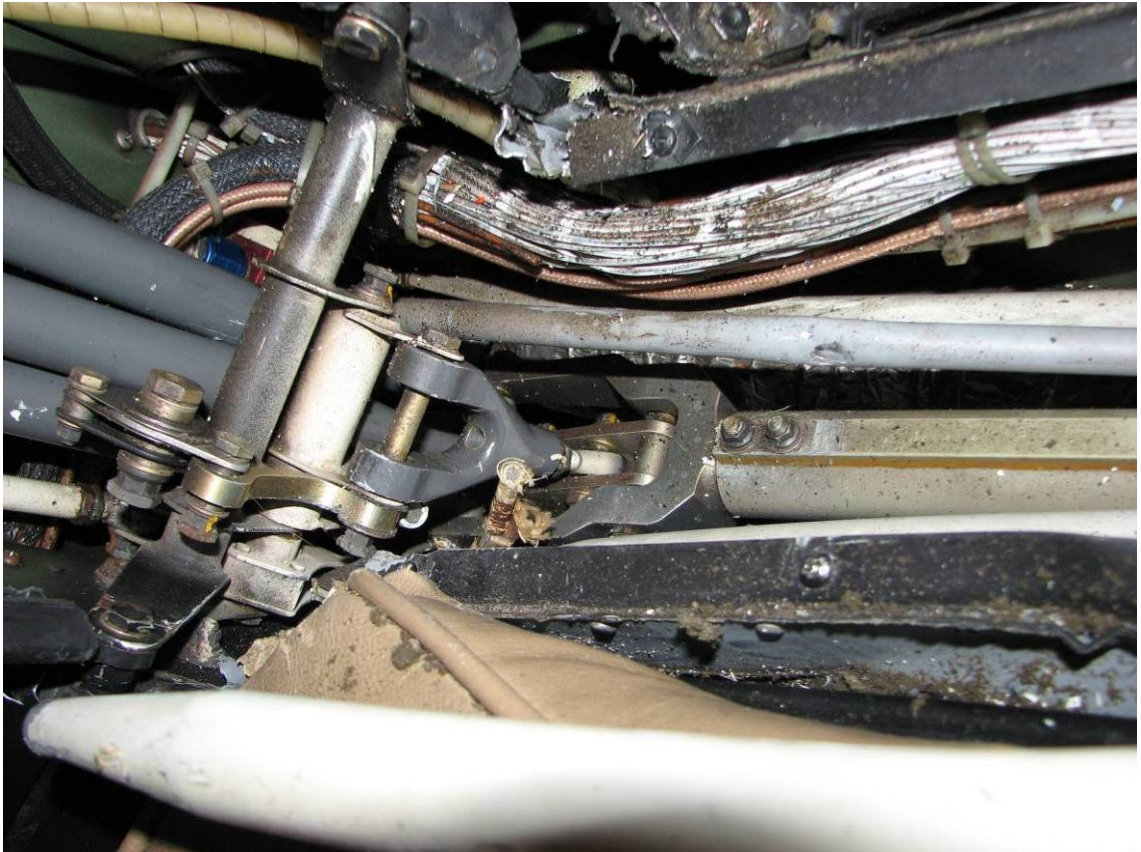


Controls in the vertical tunnel

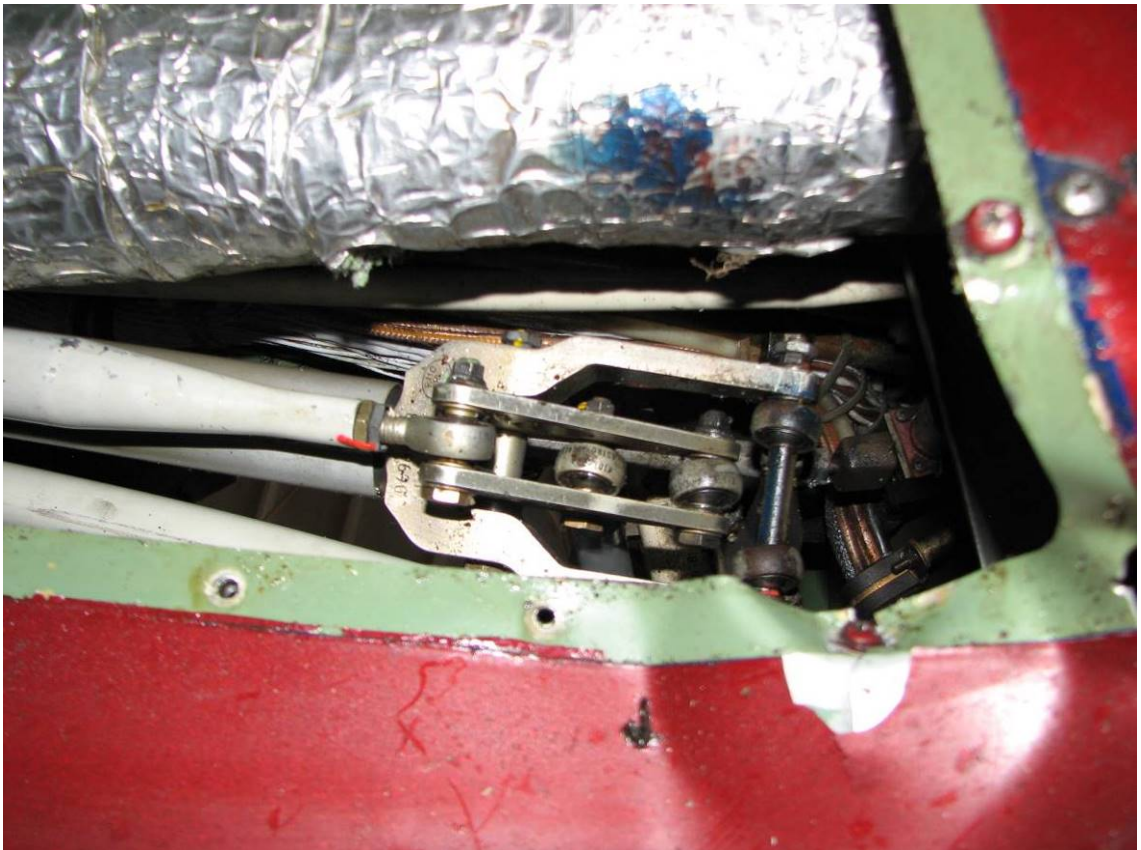


Controls in the aft end of the tunnel, from below





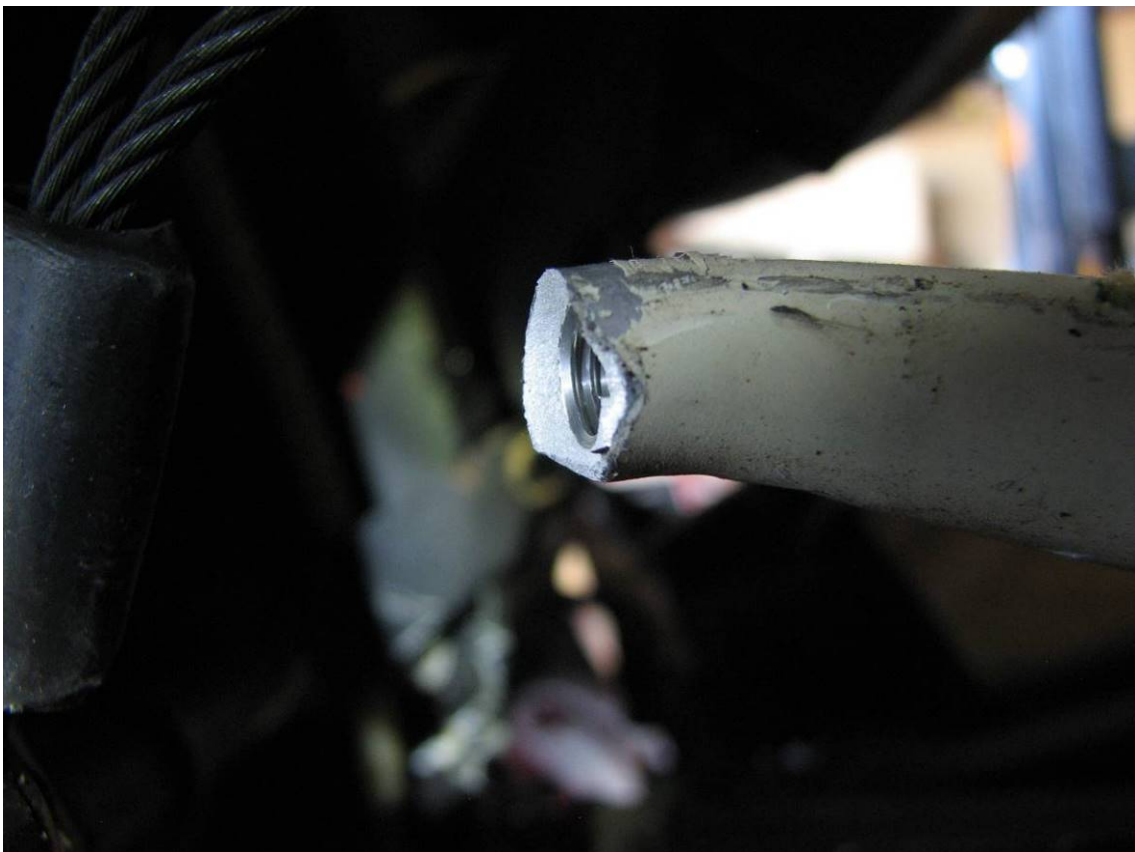
The mixing bellcrank, from above



The mixing bellcrank, from below



Disconnect B at the aft end of the C121-19 push pull tube



Disconnect B at the aft end of the C121-19 push pull tube





Controls at the base of the cyclic stick



The cyclic stick, lower portion



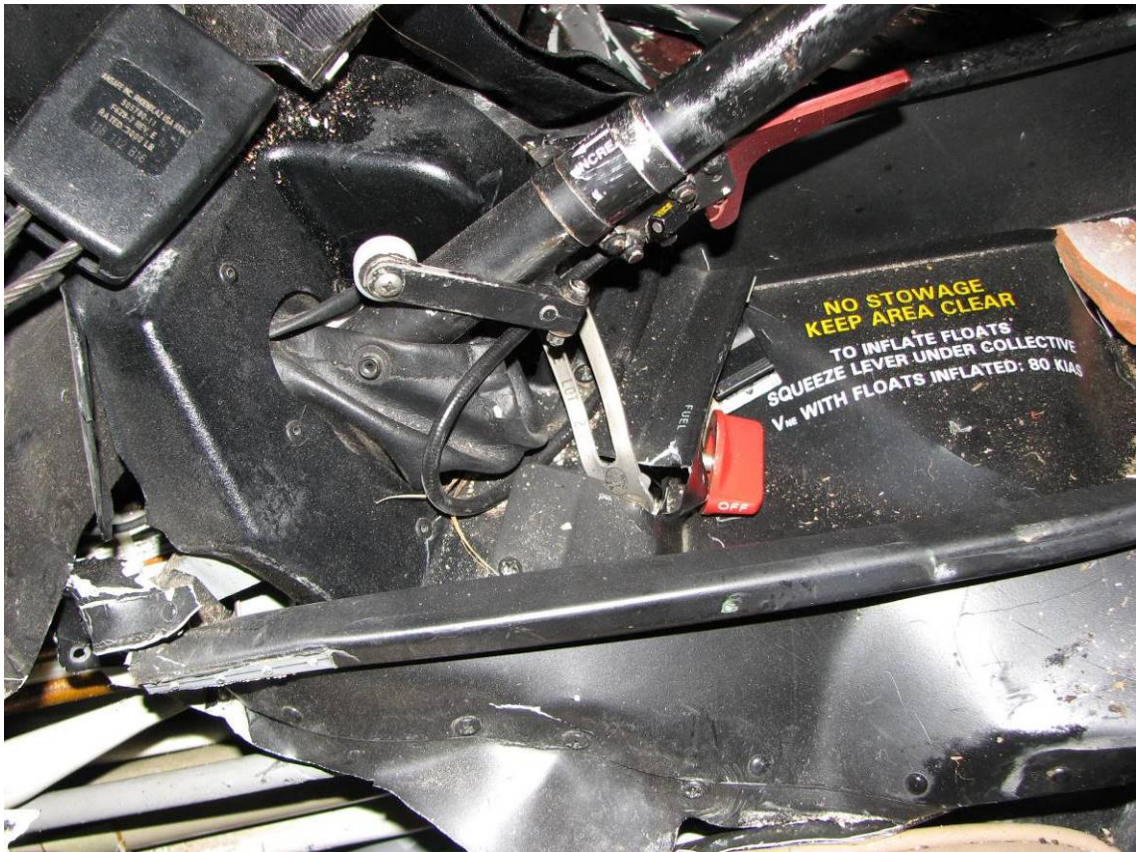


The cyclic stick, upper portion



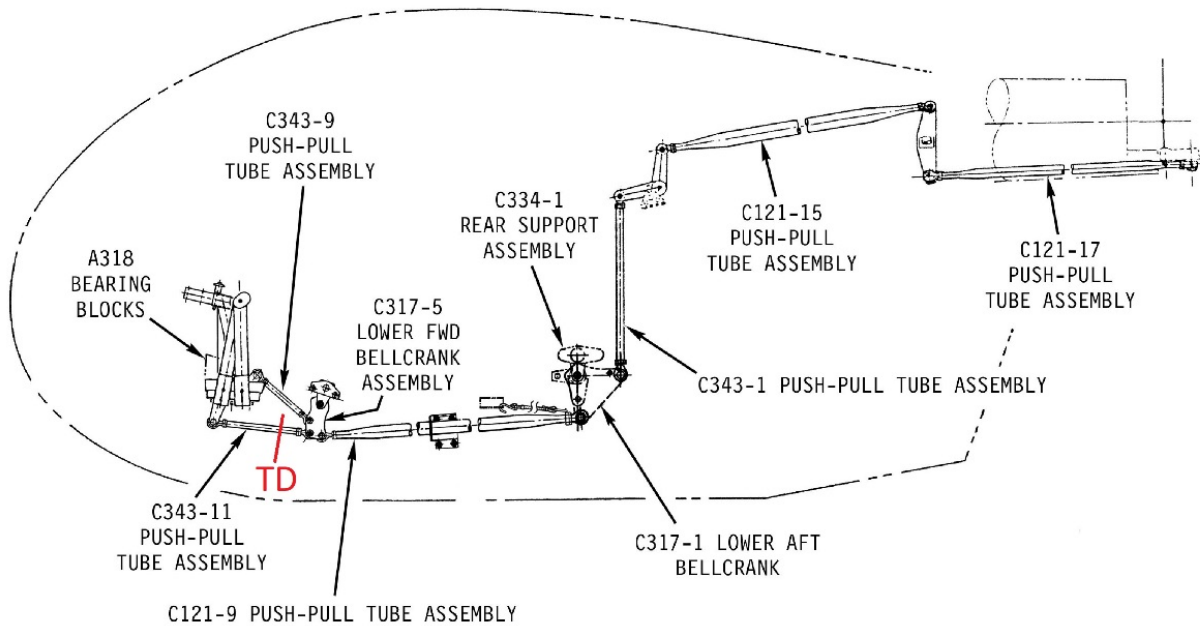
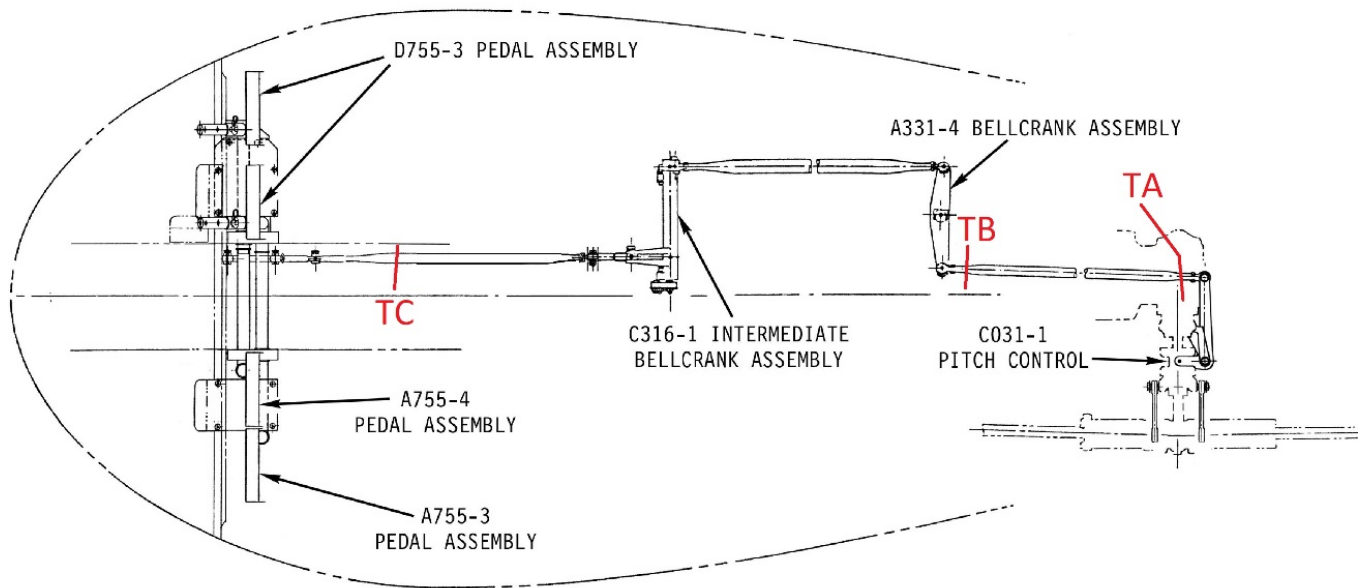
Disconnect C in the cyclic stick (cut by emergency responders)





The collective control

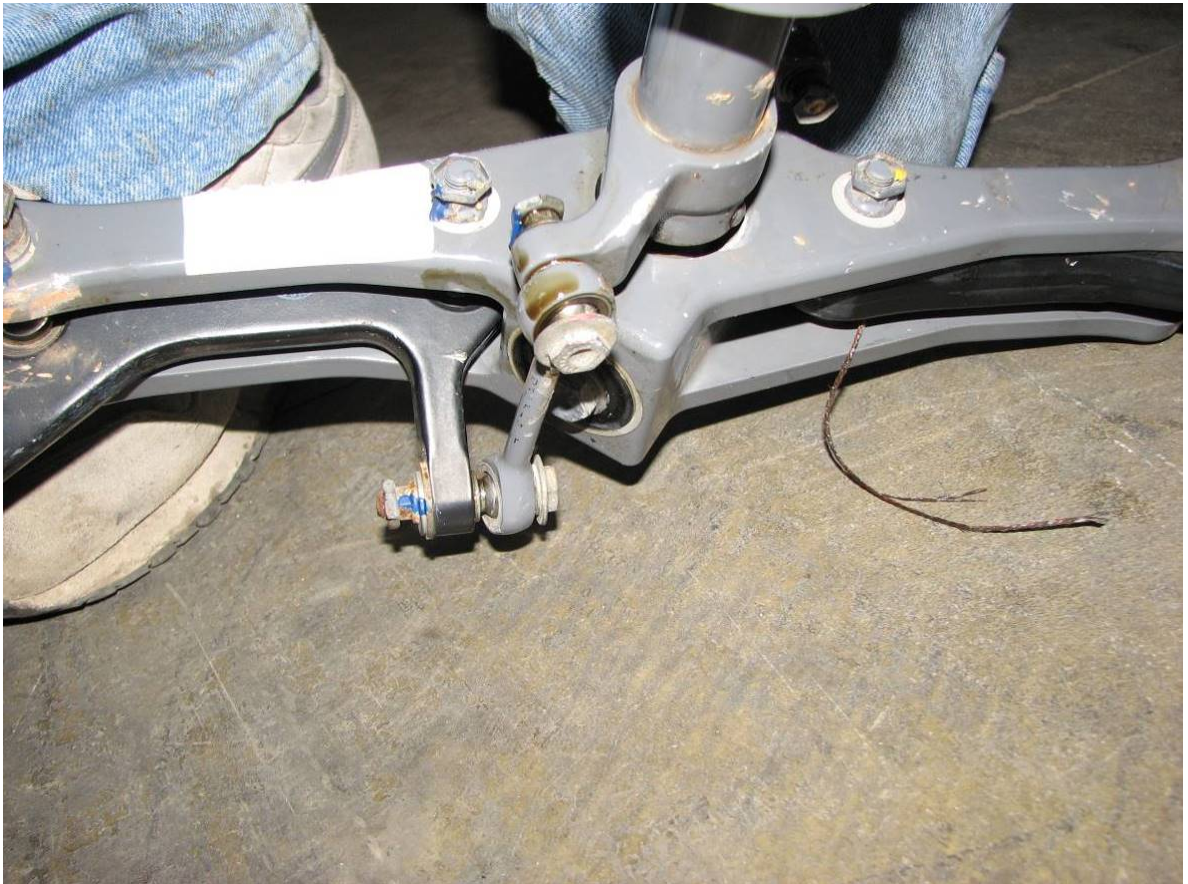
# R44 ADJUSTABLE TAIL ROTOR CONTROLS







The pitch link for the “non-target” tail rotor blade



The pitch link for the “target” tail rotor blade



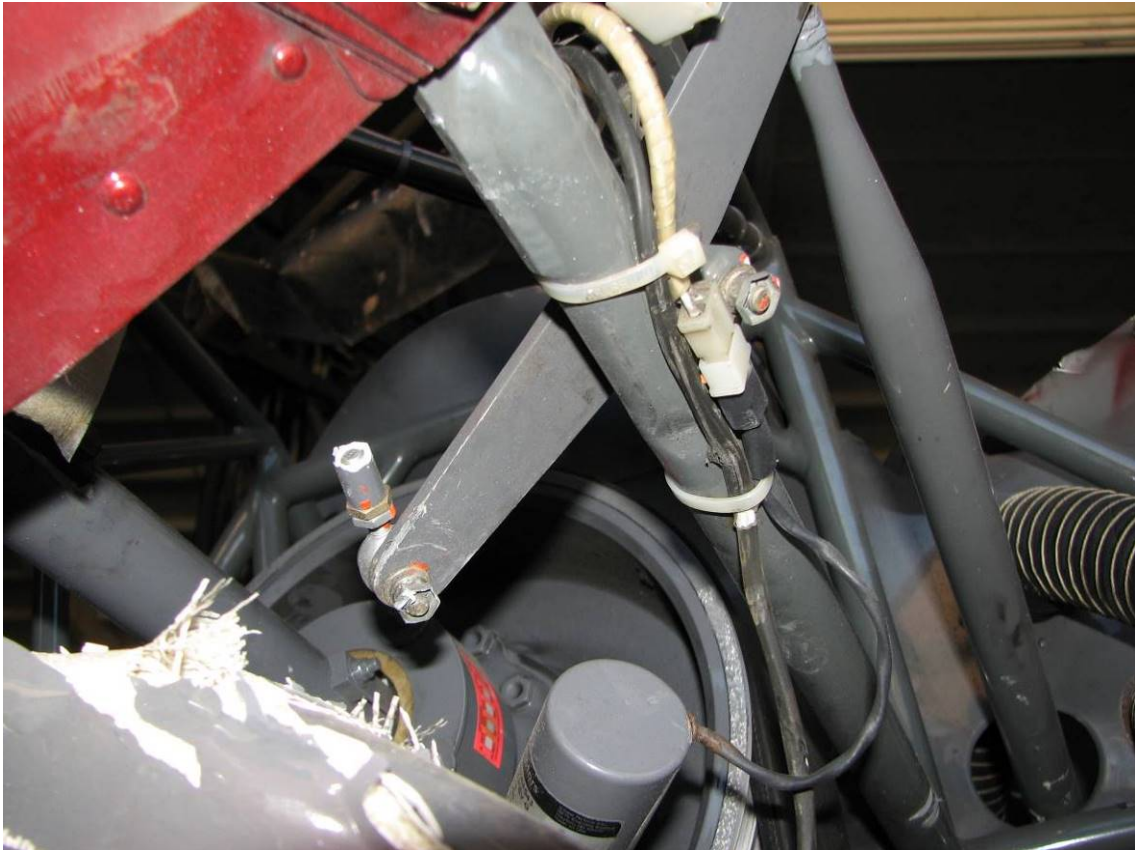


The aft tail rotor bellcrank



Disconnect TA in the C121-17 push pull tube





Disconnect TB in the C121-17 push pull tube and the A331-4 tail rotor bellcrank



Disconnect TB in the C121-17 push pull tube





The tail rotor controls in the gearbox compartment



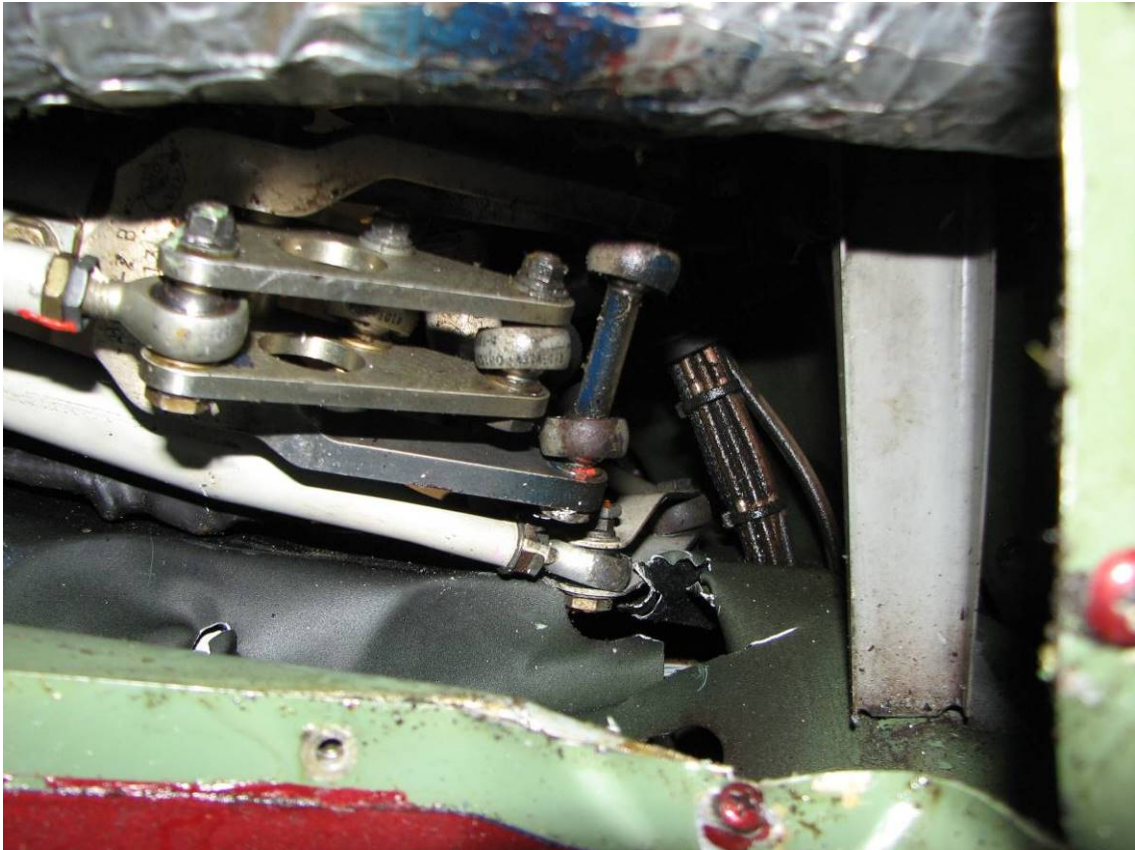
The C316-1 bellcrank at the firewall intersection



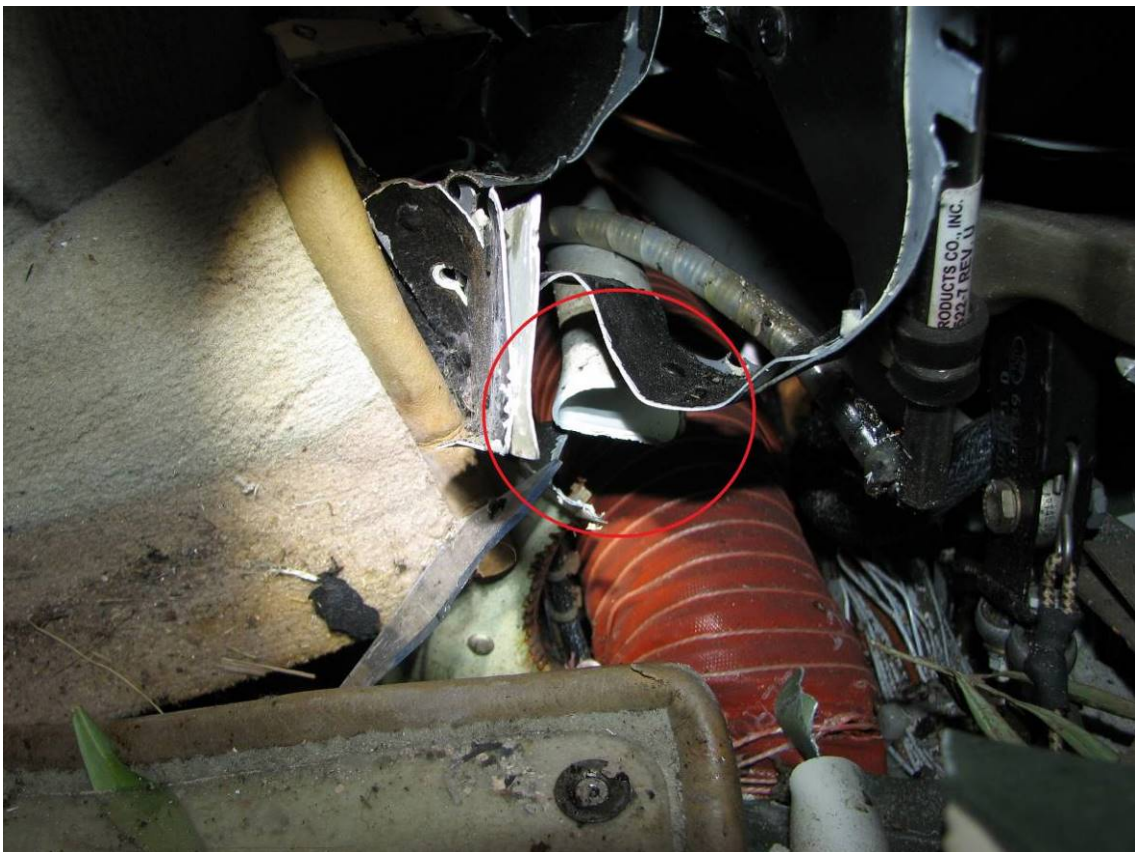


The C343-1 push pull tube





The C121-9 push pull tube and the C317-1 bellcrank



Disconnect TC in the C121-9 push pull tube





Disconnect TC in the C121-9 push pull tube



The tail rotor control tubes at the pedals



Disconnect TD in aft portion of the C343-11 push pull tube



Disconnect TD in forward portion of the C343-11 push pull tube





The tail rotor pedals, pilot side

## **AIRFRAME**

The airframe sustained substantial impact damage.

The cabin structure was deformed and fractured. The roof and door frames were cut by first responders. Fragments of both windshields and all four doors were recovered near the main wreckage.

The horizontal firewall was distorted overall with more extensive damage at the forward edge. The cabin bulkhead was distorted and crushed downward mostly on the right side. The vertical firewall was distorted overall with more extensive upward crushing on the lower left side.

The upper steel tube frame had no visible damage. Both lower steel tube frames were bent near the landing gear mounts.

The tailcone was separated at the fourth bay and at the aft bulkhead. The surface of the fractures at the separations were angular and jagged. Tailcone bays one and two were crushed and fractured. Tailcone bays three and four were partially flattened. The aft section of tailcone was dented and scraped and had red porous material on the lower surface at each end which appeared to match the color and material of the roof tiles of the surrounding houses. Only small sections of the aft bulkhead remained attached to the tailcone. The empennage was detached and located per the wreckage distribution diagram. A small section of the aft bulkhead remained attached to the empennage.

The upper vertical stabilizer had a small dent in the leading edge. The horizontal stabilizer was crushed inward at the tip. The lower vertical stabilizer was deformed upward and slightly to the right. The lower auxiliary stabilizer was fragmented and the tail skid was bent upward. Both the auxiliary stabilizer and the tail skid had scrape marks along with red porous material near their leading edges which appeared to match the color and material of the roof tiles of the surrounding houses.

The tail rotor guard was separated in three places. The ends were flattened at each separation and the surfaces of the fractures were angular and jagged. The four sections had several contact/scuff marks with material transfer of various colors.





The airframe from the top



The airframe from the right side during wreckage recovery





The airframe from the front





The airframe from the bottom



The airframe from the right rear quarter during wreckage recovery





The airframe from the left rear quarter during wreckage recovery



The airframe from the left side during wreckage recovery





The airframe from the rear



The cabin roof





The engine rear cowling and tailcone cowling



The mast fairing





The right front aircraft door



The left front aircraft door





The right rear aircraft door



The left rear aircraft door





Damage to the horizontal firewall and cabin bulkhead



Damage to the horizontal firewall





Damage to the vertical firewall



The steel tube frame at the tailcone attachment





The forward section of the tailcone, from the right



The forward section of the tailcone, from the right





The aft section of the tailcone, as found at accident site



The aft section of the tailcone, from the bottom





The aft section of the tailcone at the separation in bay 4



The aft section of the tailcone at the separation in bay 4





The aft section of the tailcone at the separation at the rear casting bulkhead



The aft section of the tailcone at the separation at the rear casting bulkhead





The empennage



The upper vertical stabilizer





The horizontal stabilizer



The lower vertical stabilizer, from the left side of the aircraft





The lower vertical stabilizer, from the right side of the aircraft



The empennage, at the casting bulkhead separation





The forward attachment point of the tail rotor visual guard



Detached portion of tail rotor visual guard number 1





Detached portion of tail rotor visual guard number 1



Detached portion of tail rotor visual guard number 1





Detached portion of tail rotor visual guard number 2



Detached portion of tail rotor visual guard number 2





Detached portion of tail rotor visual guard number 3



Detached portion of tail rotor visual guard number 4 (upper in photo)





The tail skid "stinger"



## **LANDING GEAR**

The landing gear was disconnected from the airframe at all four mounts. The bearing housings were fractured. The surfaces of the fractures were angular and jagged.

The aft cross tube was disconnected at the left elbow. The surface of the fracture was angular and jagged.

The forward cross tube appeared to be straight.

There was no indication of the elbows rotating on the cross tubes.

Both skid tubes were fractured at the strut mounts. The surfaces of the fractures were angular and jagged.

Both floats had some inflated and some deflated chambers. The float gas cylinder remained secure under the front left seat. The pressure gauge on the cylinder showed zero pressure. The floats were deployed at the time of the examination, yet the collective activation lever shear pin was intact.





The landing gear at the accident site, after fuselage removal



The landing gear at the accident site, after fuselage removal





The landing gear cross tubes and struts



The left rear strut, from the bottom





The left rear strut, from the top



The rear cross tube





The fracture of the rear cross tube



The fracture of the rear cross tube





The right rear strut, from the bottom



The right rear strut, from the top





The left front strut



The front cross tube





The right front strut



The right skid tube





The toe of the right skid tube



The back end of the right skid tube





The back end of the right skid tube



The left skid tube



The toe of the left skid tube



The toe of the left skid tube





The back end of the left skid tube



The back end of the left skid tube



The pop-out float gas cylinder



START Jan 30, 2018 12:56:31 PM  
FINISH Jan 30, 2018 12:57:50 PM  
PRODUCT AV GAS  
TICKET NUMBER 101905  
TRUCK # 1091  
TAIL # N7530R  
EMPLOYEE ID [REDACTED]

-----  
SYS.GRS TOTAL BEGIN GAL 33336.0  
SYS. GRS TOTALIZER GAL 33351.8

Gross GAL 15.8

The calculation of takeoff fuel is as follows:

29.5 Gallons	Usable capacity of R44 main tank with bladders
<u>-15.8 Gallons</u>	Fuel required to "top main" according to ACI Jet
13.7 Gallons	Fuel in the main tank prior to fueling

13.7 usable gallons in the main tank corresponds to 4.3 usable gallons in the auxiliary tank, based on the main tank/auxiliary tank fuel level chart.

29.5 Gallons	Fuel in "topped" main tanks after fueling
<u>+4.3 Gallons</u>	Fuel in auxiliary tank according to CAD fuel leveling model
33.8 Gallons	Estimated usable fuel at takeoff

This estimation is a conservative estimate that does not account for the fuel crossfeeding between tanks during fueling. There was likely more fuel aboard than 33.9 gallons, however there is no way of estimating how much with any amount of reasonable accuracy as it depends on how fast the fuel was pumping into the main tank.



investigation@robinsonheli.com

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**From:** Thom Webster [REDACTED]  
**Sent:** Monday, June 17, 2019 3:03 PM  
**To:** [REDACTED]  
**Subject:** FW: WPR18FA077 - Weights

---

**From:** Cawthra Joshua [REDACTED]  
**Sent:** Monday, June 17, 2019 2:40 PM  
**To:** [REDACTED]  
**Subject:** WPR18FA077 - Weights

Thom,

Per our conversation, the Orange County Sheriff Department's Coroner reported the following weights for three of the occupants:

Front Right - Pilot - J. Tena - 175 lbs  
Right Rear Seat passenger - K. Watzman - 228 lbs  
Left Rear Seat Passenger - B. Reichelt - 146 lbs

The surviving passenger, seated in the front left seat, reported during a telephone conversation on November 27, 2018, that he had weighed about 168 lbs around the time of the accident.

Additionally, the coroner reported that a backpack, weighing about 12 lbs was recovered from the helicopter as well (position unknown).

Josh

Joshua Cawthra  
Senior Aviation Accident Investigator  
National Transportation Safety Board  
[REDACTED]

[REDACTED]

Weight / Balance & Equipment List Revision  
Advantage Aviation, Inc. - [REDACTED]

Page #: 1

A/C Tail #: N7530R  
Register Name: SPITZER HELICOPTER LLC  
Name 2: [REDACTED]  
Address 1: [REDACTED]  
Address 2: [REDACTED]  
City, State, PC: CANYON LAKE, CA 92587-8405

A/C Make: ROBINSON  
A/C Model: R44  
A/C Serial #: 1295  
WO Ref #: 8153  
WB Date: Jan-19-2018  
WB ID #: 10

Chino, CA 91710 Tel: 909-606-0220

Previous data taken from document dated Aug-11-2015 Previous useful load = 867.00

Model Serial #	Description Part #	(LB / IN) Weight Previous data ->	CG/Arm	LON Moment	LAT CG/Arm	Moment
REMOVED -----						
KT70C 20391	TRANSPONDER 066-01156-0201	-2.40	27.00	-64.80		
CI 2480-201 363928	COM ANTENNA CI 2480-201	-0.60	156.00	-93.60		
REMOVED	2 Items @	-3.00	52.80	-158.40		
INSTALLED -----						
GTX 335 JES401551	GTX 335 w/ WAAS System 010-01214-41	2.87	27.00	77.49		
CI 2580-200 559607	WAAS GPS/26 SDB/VHF/TCN/BNC CI 2580-200	0.60	156.00	93.60		
INSTALLED	2 Items @	3.47	49.31	171.09		
NEW DATA >>	NEW USEFUL LOAD = 866.53	1533.47	105.48	161744.19	-0.19	-291.30

NOTE: Weight and Balance data is calculated data based on most current information provided. This facility cannot verify the accuracy of past data and is not responsible for any past weight and balance data or computations. It is the responsibility of the aircraft owner/operator and the pilot to insure that the aircraft is properly loaded. All subsequent changes in weight and balance are the responsibility of the aircraft owner/operator.

Authorized Individual: VZKR081Y Brandon Anderson